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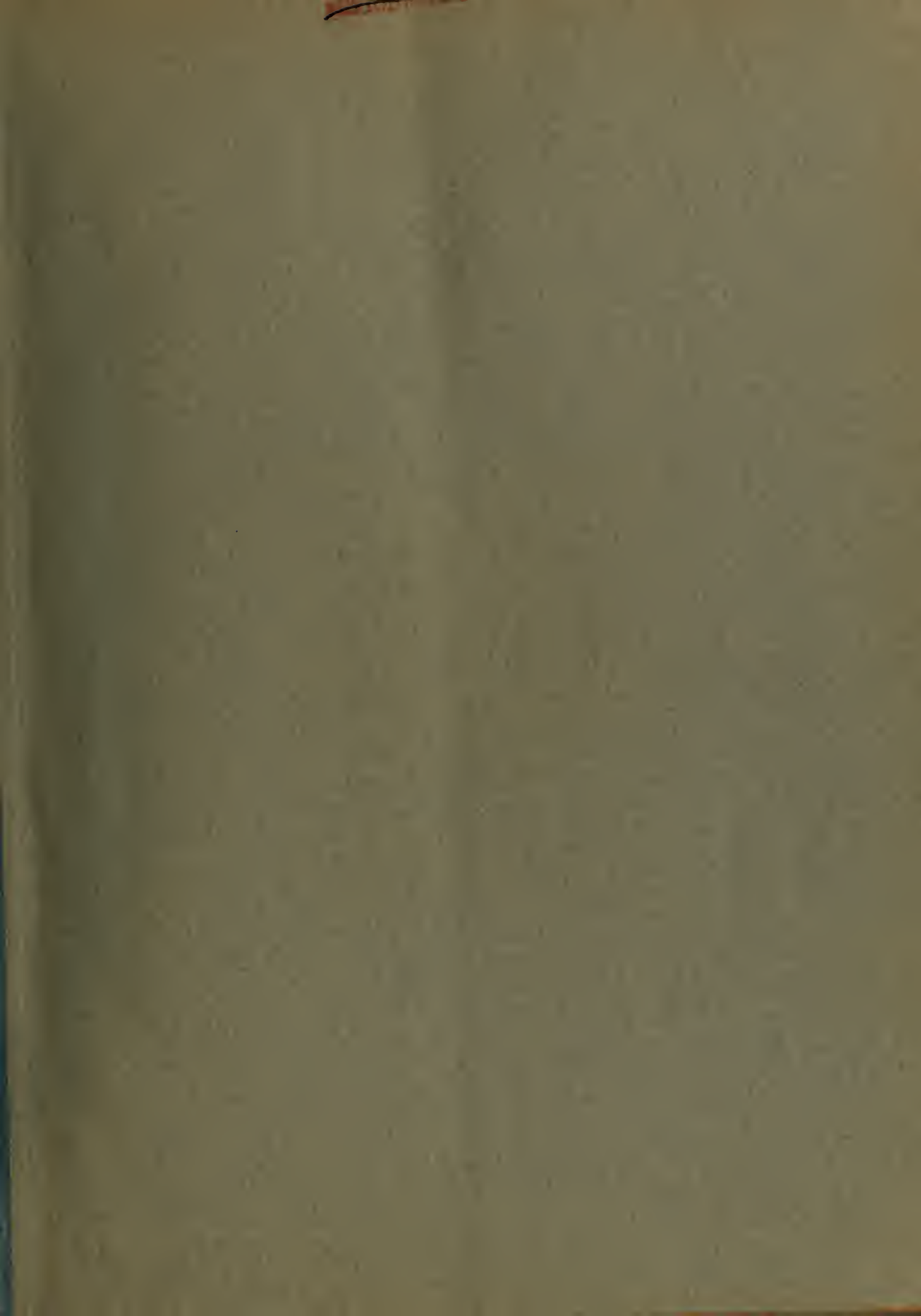
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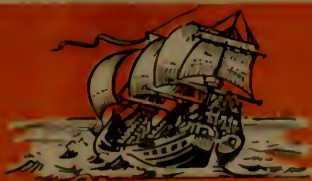
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VOLUME XXIX

JANUARY, 1932

NUMBER 1

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With beautiful lines below and aloft, the Mariposa makes very little disturbance at full speed.

Steamship Mariposa Exceeds Guarantee

THE passenger and express cargo liner Mariposa, first of three sister ships building at the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., Quincy, Massachusetts, for the Oceanic Line of the Matson Navigation Company of San Francisco, was tested very thoroughly in a three-day sea trial December 9, 10, and 11; and after successfully passing all requirements was delivered to her owners on December 14. Her maiden voyage will be a South Pacific Cruise and she is scheduled to leave San Francisco on this cruise February 3.

Mariposa has a water-line length of 628 feet, a molded beam of 79 feet, and a molded depth of 52 feet, 9 inches. Her trial draft was 25 feet, 6 inches, with a corresponding displacement of 23,230 tons.

Standardization trials were carried out at the navy measured mile, Rockland, Maine. On three full speed runs she averaged 22.274 knots at 28,030 shaft horsepower and 131.8 revolutions a minute. Her high single run was made at 22.843 knots, with 28,270 shaft horsepower and 132 revolutions a minute. These speeds were checked by the Pitometer Log installed by the Kearfott Engineering Company.

On the 12-hour economy run Mariposa averaged 0.627 pound of fuel oil per shaft horsepower hour.

Mariposa is propelled by twin screws, each driven through single reduction gearing by a Bethlehem impulse-reaction type three-stage turbine. Steam for these turbines is generated in twelve Babcock & Wilcox water-tube boilers of the interdeck superheater type, with a working pressure of 375 pounds per square inch and

a total temperature of 640 degrees Fahrenheit. Her boilers operate under forced draft in a closed stokehold. She has an oil bunker capacity of 6300 tons which will insure a steaming radius of 20,000 nautical miles.

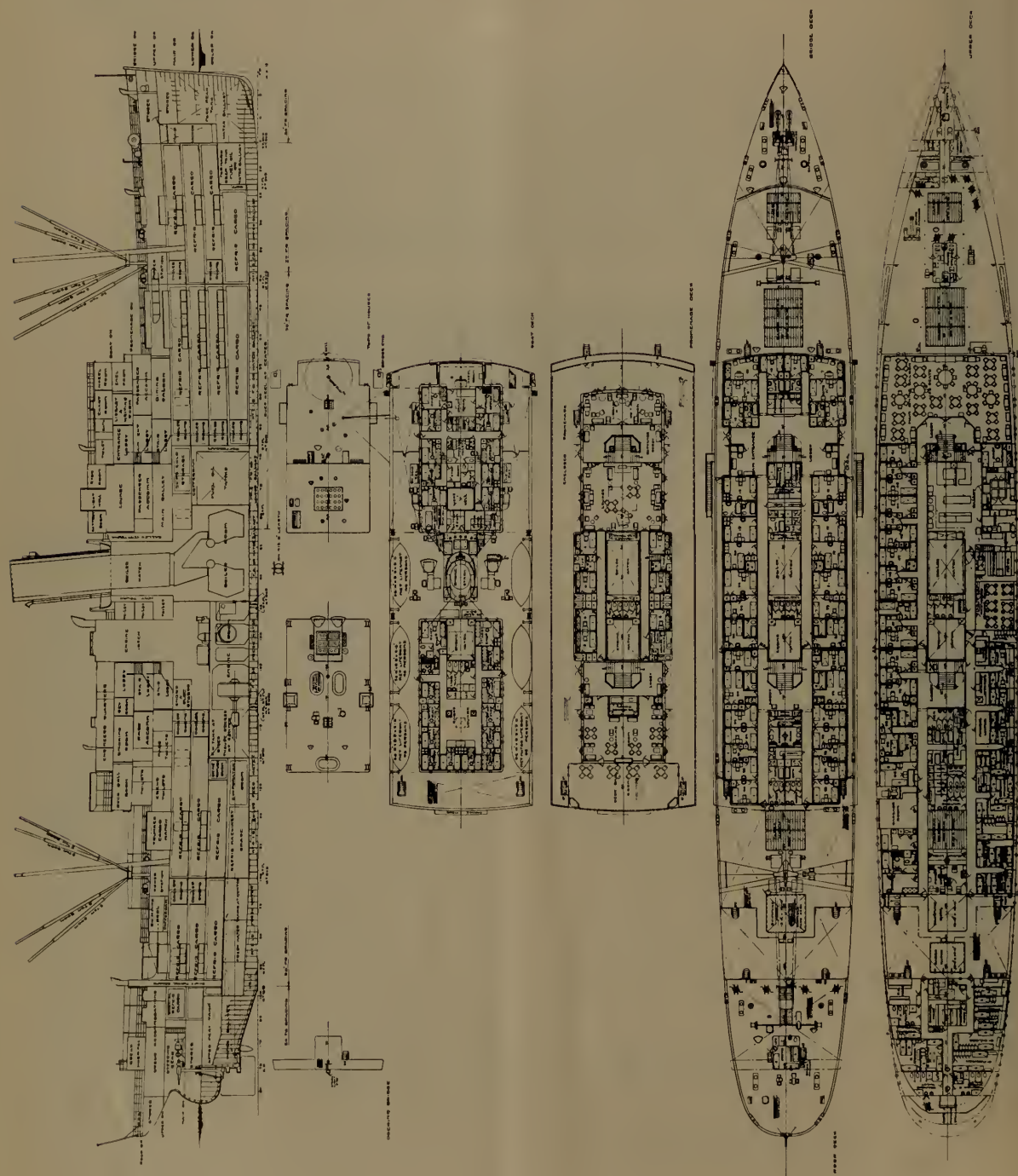
She has accommodations for 477 first and 229 tourist class passengers and a crew of approximately 389 persons.

The Mariposa is built to highest class of the American Bureau of Shipping for seagoing vessels; meets all requirements of the United States Steamboat Inspection Service and of the United States Public Health Service; conforms to all the regulations of the 1929 London Conference for Safety of Life at Sea. She will be fully described and illustrated in the February issue of Pacific Marine Review.

A number of representative shipping men were on the trial trip as observers and as guests of the builders. These included: Messrs. Wakeman, Schick, and Gould of the Bethlehem Shipbuilding Corporation, Ltd.; Messrs. Dierix, Nichols, and Harris of the Matson Navigation Company; Messrs. McAllister and Arnott of the American Bureau of Shipping; Captain Cox and Commander Wyncoop of the United States Navy; Messrs. Barnett and McGinnis of the United States Shipping Board; Messrs. Petersen and Nichols of the Newport News Shipbuilding & Dry Dock Company; President Bardo of the New York Shipbuilding Company; Mr. Heck of Lloyds; Mr. Metten, consulting marine engineer; and Mr. Fear, consulting naval architect.

Captain J. I. Kemp was in command for the builders.

Inboard Profile and General Arrangement Plan of the Steamship Talamanca and Five Sister Ships





Talamanca presents a graceful profile as shown here opposite her builder's yard.

Important Addition to Pacific Shipping

First of Three Combination Passenger and Refrigerated Cargo Steamers Delivered by Newport News Shipbuilding & Dry Dock Company to the United Mail Steamship Company for Pacific Service

AN outstanding vessel of the year 1931 is the fruit and passenger steamship Talamanca, which the Newport News Yard delivered on December 12 to the United Mail Steamship Company, a subsidiary of the United Fruit Company. This vessel is the first of six practically duplicate ships for which contracts were placed in August, 1930, all of which will join the "Great White Fleet" within the next few months. The orders for three of these vessels were placed with the Newport News Shipbuilding and Dry Dock Company and for the other three with the Bethlehem Shipbuilding Corporation. To the Talamanca, therefore, belongs the distinction of being the first of an unusually large number of new sister ships and practically the first American-built addition to what is the largest fleet of fruit carriers in the world.

While the passenger trade is an important part of the service in which these vessels will be engaged, as is also the carriage of general cargo, the carriage of fruit is the most important business, and in the final analysis the cubic capacity for the carriage of bananas was the determining factor. This capacity having been finally fixed by the owners, as well as the speed requirement and the number of passengers to be accommodated, the principal dimensions were determined by the Newport News company to meet the stated requirements and other essential features of a seaworthy vessel. The general design was then developed by them in close cooperation with the owners, represented by H. H. Robson, general manager of the Marine Department, and Captain D. H. Young, Superintendent of New Construction for the United Fruit Company. Due consideration was given to the requirements of the United States Shipping Board for vessels built under the Merchant Marine Act, 1928, these including full compliance with the requirements of the safety-at-sea convention (1929), and in at least one important feature in excess thereof, as hereinafter noted. Careful attention was given to the form of the vessel and several models were tested in the Washington model basin,

both towed and self-propelled, before the final lines were adopted. The shape of appendages was also carefully investigated to reduce resistance and facilitate stream-line flow. Twin-screw bossings as fitted embody the latest ideas developed in model-testing basins. In line with the best modern practice, the rudder is also stream-lined.

Principal characteristics are as follows:

Length over-all	446' 9"
Length on 24-foot waterline	430' 0"
Length, between perpendiculars	415' 0"
Beam, molded	60' 0"
Depth, molded to upper deck	34' 9"
Maximum draft, molded	24' 9"
Displacement at maximum draft, tons	11345
Gross tonnage	6963
Net tonnage	3183
Cargo capacity, net, cubic feet	196000
Fuel oil capacity, tons	1450
Fresh water capacity, tons	626

Ordinary flat bar stems with a slight forward rake were adopted, fitted without bulbs, and with the fore-foot cut up moderately. The type of stern is of the protected-rudder type used on such recent vessels as the steamships President Hoover and President Coolidge of the Dollar Line, the steamships Morro Castle and Oriente of the Ward Line, and the Florida of the P and O Line, all of which were built by the Newport News Shipbuilding & Dry Dock Company. This type gives better protection to the propellers when docking and, in association with a stream-lined rudder, gives a form which is little if any inferior to the cruiser type. The rudder is semibalanced with a cast steel frame in one piece, to which the double plates are electrically welded, and there are two brass-encased pintles which work in lignum vitae bearings.

The Talamanca, with her two well-placed masts, one stack, and nicely formed stern, presents a very symmetrical, ship-shape and handsome profile. She has a

combined forecastle and bridge, a poop with a short well between it and the bridge, and three tiers of erections above the bridge deck. There are four completely plated steel decks. Eight watertight bulkheads extend to the upper deck or beyond, subdividing the vessel into nine compartments. This subdivision, in excess of the requirements of the Convention for Safety of Life at Sea (1929), makes a two-compartment vessel, able to keep afloat with any two compartments flooded. The two-compartment feature is one of the requirements of the United States Shipping Board in making loans for ships constructed under its loan agreements. Incidentally, it may be remarked that in no other type of ship have these subdivision requirements caused such an increase in the cost of construction as in fruit carriers. The shorter compartments now required necessitate a decided increase in the number of air-cooling units, and these additional units make a very appreciable reduction in the space available for cargo. Consequently larger ships are now required to obtain the same net cargo capacity as was available in earlier ships in which long compartments were permitted; and this, in the final analysis, means, of course, a material increase in the cost of a ship to carry the same amount of fruit.

An item of special interest in the construction of the double bottom is the fitting of a duct keel between No. 1 hold and the boiler room. Its object is the elimination of piping in the holds, an especially desirable feature where the compartments are insulated. Forward, where the ship is fine, the double bottom extends to the orlop deck, forming a deep tank for fuel oil or water ballast. All double-bottom compartments forward of the engine room are arranged to carry fuel oil or water ballast, and all compartments aft carry fresh water for boiler feed. Additional fresh water capacity is provided in two tanks built-in abreast the thrust recess off the engine room and between the shaft tun-

nels aft of the refrigerating machinery room. For additional fuel oil capacity there is a deep tank immediately forward of the boiler room, divided into four compartments athwartship, the two center ones being used for service tanks. In order to avoid possibility of any oil leaking into cargo spaces or streaking the sides of the vessel, cofferdams are fitted between the deep tank and the cargo hold, also at the sides and top of the tank. These cofferdams also permit of repairs being made to the tanks without the necessity of placing the ship in dry dock.

All the erections are of steel construction and all decks, including all the superstructure decks and the tops of the houses on the boat deck, are completely plated. The upper deck, in the well, is sheathed with an Oregon pine caulked deck and teak margins, and the weather-exposed parts of the poop, bridge, and promenade decks are similarly sheathed; the boat deck is sheathed with teak. No wood sheathing is laid on the tops of the boat deck houses—the steel plating is exposed to the weather and 3-inch Armstrong cork insulation is fitted under the deck instead. Within the superstructure Selbalith magnesite floor is used throughout, except in galley, pantry, and toilet spaces. In the passenger accommodations and boat deck house, the magnesite forms a base for other covering, and in the crew's spaces on the upper deck and in the poop it forms the finished floor. All floors in passengers' public and private toilets, and in officers' toilets, are laid with ceramic tiles, and quarry tile is laid in all galley and pantry spaces.

Passenger Accommodations

The accommodations for passengers are in keeping with the high standard of "The Great White Fleet" and include many features heretofore confined to only the largest passenger ships. Among these may be cited such modern innovations as a permanent out-door swimming pool and a deck ballroom. Only first class passengers are carried, accommodations for 113 being provided in 61 rooms, all of which are outside rooms. Two suites with sitting room, stateroom, and private bath are provided. There are six staterooms with private bath, eight with a connected private bath between two adjoining staterooms, and nine rooms with private toilet and shower.

All rooms with private shower and toilet are single; those on the promenade deck, where that type of room is fitted exclusively, also have a sofa berth, these rooms being amply large for two persons when desired.

Single metal beds are fitted in all staterooms; in only two of the regular staterooms are there any upper berths. A number of rooms are arranged with a door communicating with the adjoining stateroom, enabling the rooms to become en suite. The staterooms are fully equipped with modern conveniences, such as large built-in wardrobes, combined dressing table and desk, electric fan, lavatory with hot and cold running fresh water, and a complete set of chromium-plated toilet fixtures for each person the room accommodates. Each stateroom on the bridge and promenade decks has two Kearfott metal-framed windows of the vertically sliding type; staterooms on the upper deck are fitted with a special pivoted-type airport. Mechanical ventilation is supplied to all staterooms, the amount of air being regulated at will by the occupants by means of a specially designed diffusing type louver recently developed by the Newport News Shipbuilding and Dry Dock Company.



The modern Spanish motif used in the interior decorations of the Steamship Talamanca is well illustrated in this entrance lobby and stairway.



Above, midnight at the fireplace; at right, a typical stateroom on the Talamanca.



Above, a foursome in one corner of the smoking room and the doorway between smoking room and deck ballroom. At right, the deck ballroom on the Talamanca, a very pleasing feature for practically open-air dancing. The long trough lighting fixtures are equipped with blue lamps, giving a moonlight effect.



The dining room on the Steamship Talamasca seats 110 persons at small tables. This room is paneled in Vehisote, with decorative mirrors and specially designed lighting fixtures. Note the attractive box drape effect in way of the port lights.



The principal decorative feature of the lounge is the large mural by Thomas G. Skinner depicting a typically Spanish rural scene. This very comfortable room has a ceiling height of 12 feet and is equipped with large bronze casement windows.

Promenade and bridge decks are entirely devoted to passenger use, while a large portion of the bridge enclosure is similarly used. The boat deck is available as a sun and promenade space. Public spaces are grouped on the promenade deck. Its forward end is enclosed at the front and sides with Kearfott sashless windows to form a glass-enclosed promenade, and at the after end there is a somewhat similarly enclosed-deck ballroom which adjoins and is directly connected to a large smoking room. Forward of the latter is a stairway lobby which connects by a passage on each side of the machinery casings with the lounge, a large comfortably furnished room with a hardwood floor which is used for formal dances and general social functions. In way of the lounge the deck above is raised to give a ceiling height of 12 feet. Adjoining the lounge on its forward side is the forward main stair lobby and immediately forward of the latter is a library and writing room which is located at the forward end of the house. The windows in the two lobbies and in the library, lounge, and smoking room are a very substantial bronze, casement type furnished by Henry Hope and Sons. The main entrance lobby is located on the bridge deck at the forward stairway, and the purser's office is directly forward of it. At the after stair lobby on the bridge deck there is a gift shop, aft of which is a barber shop. The main dining saloon is located on the upper deck forward of the main stairway and has a seating capacity of 108 at small tables. Immediately aft of the dining room are the main galley and pantry spaces which are fully equipped with modern cooking and food-serv-

ing appliances, most of which, including the ranges, are electrically operated, supplied by Edison General Electric Appliance Co. At the after end of the bridge deck there is an open-air swimming pool. A hospital, exclusively for passengers is provided (in addition to a crew's hospital) adjoining the doctor's office, and there is also a well-equipped surgery.

The architectural design, interior decorations, and furnishing of all public spaces is the work of Barnet Phillips and J. P. Kiesecker, Associates. Modern Spanish is the dominant note which is very appropriate in view of the fact that the vessel's service is with Latin American countries. The stenciled ceilings which are such a prominent feature of that type of architecture have been admirably carried out in the library, main lobby, lounge, smoking room, and deck ballroom. In the lounge a large oil painting by Thomas C. Skinner depicts a typical Spanish setting. In the dining room and lounge a paint finish is used, and all lobbies, the library, the passages in the promenade deck house and the main stairways are paneled in mahogany stained a dark brown. The smoking room is paneled in specky cypress, with a corresponding beamed ceiling, forming a very distinctive design.

The paneling in public rooms, except as otherwise noted, is of Vehisote finished in white, cream and pastel shades of paint to suit the decorative scheme of the particular room.

Electric fixtures are all of special design to harmonize with the treatment of individual spaces. In the deck ballroom the general lighting is furnished by



The enclosed portion of the promenade deck space on the Steamship *Talamanca* is equipped with Kearfott sashless windows.

Spanish lanterns, finished in antique iron, and for night dancing there are trough lighting fixtures with heavy corrugated crystal glass panels located in the cornices at convenient stations. These fixtures are fitted with blue lamps to give a moonlight effect in conjunction with a flood of yellow light coming from troughs concealed in flower boxes at the after corners of the room and from a large flower box located in the smoking room under the large windows which open into the ballroom.

Except in the lounge and deck ballroom the floor covering in all of the public spaces, including lobbies and passages, is rubber tile furnished by the U. S. Rubber Company and laid by the shipbuilders. A hardwood floor is laid in the lounge and a calked teak deck with wax finish in the deck ballroom.

A centralized radio system of the latest type is another of the many modern features provided for the entertainment of the passengers. This is located in a separate room amidships on the promenade deck, and provision is made for transmitting radio broadcast reception programs or phonograph recordings to loud speakers located in the dining saloon, lounge, smoking room, and deck ballroom. Provision is also made for plugging in speakers on the open promenade deck.

Cargo Arrangements

Subdivision of the hull provides two cargo holds forward of the machinery spaces and two aft. With the four complete decks in the hull there are therefore fourteen compartments for cargo, eight forward and six aft. There are no cargo spaces under the orlop deck. All cargo spaces are completely insulated with Armstrong regranulated cork, and the void spaces not filled by the latter are filled with cowhair. The entire cargo space is provided with air-cooled refrigeration, the two sides of each compartment for its entire length being fitted with air ducts through which the cold air discharges at the bottom underneath the portable wood gratings which cover the entire deck area. The arrangement of the air ducts is an original one devised by H. H. Robson, General Manager of the Marine Department of the United Fruit Company, and provides for an equable distribution of air throughout the length of each compartment. The system provides for close regulation of the air supply by means of adjustable louvers which are so located as to be readily accessible at any time. Provision is also made for the admission of fresh air, as and when desired, and the escape of vitiated air. Except in the case of the small compart-

ments at the ends of the vessel, each compartment has individual air cooling and circulating units. The whole carefully designed arrangement for providing air circulation throughout the cargo spaces is based on the long and extensive experience of the United Fruit Company in the successful carriage of bananas and is believed to be the largest and most completely equipped plant of its kind afloat for that purpose. Particular attention has been given to the lighting of the refrigerated cargo spaces. Porcelain enameled steel parabolite type lighting fixtures, each with one 100-watt lamp, are mounted around all sides of each compartment, about 25 feet apart, and are set in heavy wood frames for protection against mechanical injury.

For the carriage of special refrigerated cargo, such as meats or other foodstuffs which require low temperatures, a separate compartment is provided at the after end of the main deck. This compartment is fitted with air ducts at the sides the same as in the other cargo spaces and is thus available as an integral part of No. 4 main 'tween decks for the carriage of fruit. It is also fitted with cooling coils and when desired for special use it may be entirely insulated from the rest of the compartment and cooled by an entirely separate refrigerating plant, which is provided especially for it.

South-bound the cargo carried is a general one, steel products being an important item. Complete facilities are therefore provided for handling miscellaneous cargo, and especially long hatches are fitted in the decks in No. 2 hold in order that rails and similar long units may be readily stowed. Each of the four main holds has a weather-deck hatch which is served by two 5-ton booms, and at No. 2 hatch there is a 30-ton boom for handling especially heavy items. In addition to the main hatches there are two wing hatches fitted in the main deck in No. 2 and No. 3 holds. These are principally for use in the handling of bananas, the loading and unloading of which are done by means of portable conveyors. Each of the main 'tween deck compartments is also fitted with a double cargo port on each side of the vessel, and in addition single ports are fitted in No. 2 and No. 3. It will thus be seen that the vessel is very well equipped for the efficient handling of all of the different types of cargo it will be called upon to transport.

Talamanca and sister ships will operate under a mail contract, and provision has therefore been made for the carriage of bulk mail and postal matter. For this purpose a special mail compartment is fitted up on the starboard side of the main deck abreast the engine

casing with direct access from the amidships storing ports. A strong room for the carriage of bullion is fitted in the mail room.

Refrigerating Machinery

The Talamanca and sister ships have three separate and entirely independent refrigerating plants, one for the air-cooled cargo space, one for the special cargo space, and one for ship's stores.

The refrigerating machinery for the main cargo is located immediately aft of the main engine room under the orlop deck, the compressors and brine pump motors in the thrust recess, and the rest of the plant in a water-tight compartment aft thereof. This plant is a carbon dioxide compression, brine circulating type in three units, the individual members of which are driven by electric motors. The capacity of this plant is such as to provide the necessary reduction of temperature of the cargo space under tropical conditions, within a reasonably short time.

The refrigerating plant for the special cargo space is a semi-automatic, direct-expansion, ammonia type, with a 2-cylinder single-acting compressor driven by an electric motor. It is located in a gas-tight compartment on the main deck aft, adjoining the cargo space for which it is used.

For the ship's cold storage rooms and the main pantry refrigerators, there is a carbon dioxide plant located on the port side of the main deck, abreast the engine room. This plant consists of two motor-driven compressors, one brine cooler, two centrifugal brine circulating pumps, one condenser, and one circulating water pump.

All refrigerating machinery was supplied by the York Ice Machinery Corporation.

Mechanical Ventilation

For circulating air in the refrigerated cargo spaces motor-driven fans are fitted in connection with the cooling units. Mechanical supply ventilation is provided for supplementary air for these fans.

Special provision has been made for the ventilation of all machinery spaces, each separate compartment being provided with mechanical supply systems. An unusual feature is the fitting of such systems to the boiler room. For the latter two 10,000-cubic feet per minute fans of the American Blower Company's H.S. or nonoverloading type, located on the boat deck, are connected to the boiler room natural ventilation trunks, a damper being fitted in the latter below the cowl and above the fan connection. These fans ensure an adequate circulation of air in the boiler room when the vessel is in port, or operating under reduced power; under normal operations, in temperature climates, these fans are not used, since natural ventilation and the circulation of air provided by the forced draft fans and the movement of the ship provide adequately for the personnel. For the ventilation of the main engine room there are three separate supply systems, which also supply the refrigerating machinery room for ship's stores, which is located on the port side of the main deck abreast the engine casing. A 750-cubic feet per minute exhaust fan is provided to eliminate the humidifying effect of the main turbine gland leak-offs. The main refrigerating machinery room aft of the engine room is provided with a separate supply system, and exhaust ventilation is provided for the refrigerating machinery room aft on the main deck.

A very complete arrangement of mechanical ventilation is provided for all passenger and crew spaces, and for galleys, pantries, and storerooms. There are seven separate supply systems and four exhaust systems. Four of the supply systems have air heaters connected to the fans, thus forming a combined heating and ventilating arrangement for all public spaces, all passenger staterooms, all officers' and engineers' quarters on boat deck, all crew's quarters and mess rooms amidships on upper deck, and to mail room, storerooms, and banana ripening room on the main deck. For the crew's quarters and galley in the poop, and the crew's hospital, there are both supply and exhaust systems; no air heaters are fitted in the supply system to these spaces, all heating being done by steam radiators. The main galley and pantry spaces have their own special ventilating systems, one supply and one exhaust being provided for their exclusive use. The smoking room is provided with mechanical exhaust as well as with heated air supply. Exhaust ventilation is also provided for all bath, shower, and toilet spaces, and for winch control rooms.

All fans and air heaters are American Blower Company's make, driven by General-Electric motors.

Hull Auxiliaries

All power auxiliary machinery throughout the vessel is electrically operated, General-Electric motors being used throughout.

The eight cargo winches were furnished by the Lidgerwood Mfg. Company. They are of the reversible, single-drum type, driven by General-Electric 35-horsepower water-proof motors through double reduction cut spur gears. One of the winches at No. 2 hatch has an additional spur gear train which operates an extension shaft fitted with two warping heads.

Two reversible capstans are fitted forward and on the poop deck. A winch of the reversible, worm geared type is fitted with an extension shaft having warping heads so arranged that the winch may be used in connection with the emergency steering gear. Each capstan and the warping winch is driven by a 35-horsepower motor. Four Watson-Stillman wire rope nippers are installed, two on the forecastle deck and two on the poop deck.

The Hyde windlass, driven by a 60-horsepower electric motor is capable of handling the two main bower anchors and their cables simultaneously.

Steering gear of the electro-hydraulic type was supplied by the American Engineering Company. The double rams are 12 inches in diameter and are mounted forward of the rudder stock, with their axes athwartship. Each of the two pumping sets consists of a low-pressure 12 Hele-Shaw pump driven through a flexible coupling by a 30-horsepower motor, which is fitted with a solenoid-operated shoe brake in order to permit operating either unit with the stop valves to the other unit open. The steering gear may be controlled from the pilot house by hydraulic telemotor, or by a Sperry two-unit gyro-pilot. A trick wheel in the steering engine space is provided for local control, and there is also a steering stand on the docking bridge, which is connected to the trick wheel by shafting and gears.

For handling the lifeboats, there are two motor-driven winches located on the boat deck, each with a 15-horsepower motor and provided with dynamic braking in the off and lowering positions. Four hoisting speeds and one lowering speed are provided.

The Talamanca and her sister ships have three separate independent refrigerating plants, one for the air-cooled cargo space, principally applied to the carriage of bananas; one for the special cargo space; and one for ship's stores. Our illustration shows the compressors for the refrigerating plant for the air-cooled cargo space. The refrigerating plant is by the York Ice Machinery Corporation; the motors are General-Electric.



Each of the two accommodation ladders is handled by a Lo-Hed electric hoist, furnished by American Engineering Company. The hoists are mounted on special davits, on which a water-proof push-button control station is also mounted.

Lifesaving and Navigating Equipment

Lifeboat capacity sufficient to accommodate the entire number of persons on board is provided in five 26-foot metallic lifeboats and one 26-foot motor lifeboat. Built of Armco iron and furnished by the C. M. Lane Lifeboat Company, these boats are handled by six sets of Lane mechanical davits. The ship is equipped also with three Lane balsa life floats in compliance with the Safety-at-Sea regulations.

Ground tackle consists of stockless anchors and stud-link cables furnished by the Baldt Anchor, Chain & Forge Company.

The very complete navigating outfit was furnished by T. S. and J. D. Negus. In addition to the customary magnetic compasses, there is a complete Sperry gyroscopic compass system and Sperry gyropilot, a radio direction-finder, and a Fathometer. Other special outfit includes two 18-inch Sperry searchlights, rudder angle indicators, Cummings revolution counters, and electric whistle and siren operators, as well as a complete radio telegraph equipment. An electrical clock system is provided, the master clock being located in the chart room.

The provisions for fire extinguishing includes a Lux carbon dioxide system for the boiler room and one for the propulsion generators, and steam smothering pipes for the cargo holds. For fire detection the Rich Fire Detecting System covers the cargo spaces. A Henschel 14-circuit fire alarm system, with thermostats in each stateroom and other required spaces and an annunciator in the wheel house protects the living quarters.

Propulsion Machinery

Selection of turbo-electric propulsion for these ships was based on very substantial grounds, the wide range of flexibility which the system provides being a particularly desirable feature for the service, while its comparative freedom from vibration appreciably lessens

the danger of the bananas being damaged by abrasion. The heavy tropical rains which so often occur at the Central American ports occasionally delay the loading of cargo, and it is sometimes necessary to make up 8 hours on the northbound voyage. A large reserve of power is therefore necessary; and the turbo-electric system supplies the necessary flexibility without loss of efficiency.

The turbo-electric equipment on these vessels includes two main turbo-generators which supply the power to the two main propulsion motors, one of which is fitted on each of the twin screw shafts. Kingsbury main thrust bearings of the two-shoe type are fitted immediately aft of the main motors, and each shaft drives an outboard turning, solid bronze propeller, having three blades of airfoil section, a diameter of 15 feet 3 inches, and 17 feet pitch. Each main turbine has fourteen stages and a maximum rating of 5500 shaft horsepower at 3500 revolutions per minute, the corresponding rating for each main generator being 4200 kilowatts, 3150 volts, 3 phase, with a power factor of unity. Steam pressure is 325 pounds at throttle, 230 degrees F. superheat, vacuum 27.5 inches at the turbine exhaust casing with seawater 85 degrees Fahrenheit. Main generators are each fitted with a surface air cooler. Each cooler has two sections of 1660 sq. feet cooling surface. Generating sets are located in the upper part of the engine room at about the lower deck level, with the control panel at the same level at the after end. Two control groups are fitted on the panel, each group containing high and low voltage contactors. The panel also contains necessary electrical instruments, field rheostat adjusting handwheels, electrical speed indicators for turbines and motors and the main operating levers.

The propulsion motors are of synchronous-induction type, maximum continuous rating 4200 kilowatts at 125 revolutions per minute, 3150 volts, 3 phase. For each motor there is a power ventilating fan of 14,000 cubic feet per minute capacity driven by a 15 horsepower motor. Combined with these two fans is one surface air cooler which has two sections, each of which has 1950 square feet of cooling surface. In order to provide space

in the lower engine room for these air coolers and ducts, the generator cables are brought out at the top of the generators and are run overhead into the top of the control cell. Field rheostats for propulsion motors and generators are also mounted overhead. Propulsion cables from the generators to the motors are thus short and direct, minimizing losses and chances of trouble. Except for the provision of closed circuit ventilation with air coolers for the propulsion motors and the method of running the cables, the electrical features of the main propulsion plant are similar in all essentials to those on recent electric drive ships. The turbine generating sets and propulsion motors were furnished by the General Electric Company.

Each main generator turbine exhausts into its own surface condenser underneath and directly attached to it. These condensers have welded steel plate shells and are of the two-pass type, each having a cooling surface of 10,500 square feet. Two Wheeler 2-stage tube-jet air ejectors, either of which is capable of maintaining 28½ inches vacuum at full power serve each condenser. There are three Warren horizontal centrifugal condensate pumps, each driven by a 10-brake horsepower motor, one for each condenser and one for reserve. Circulating water is provided by two Warren centrifugal pumps, each of 9000 gallons per minute capacity and driven by a 32½-horsepower motor. The condenser on the port side is so connected as to be available for use auxiliary generator sets. Scovill tubes and outlet glands are used in this condenser plant.

In addition to the main condensing plant there is an auxiliary condenser with a cooling surface of 2200 square feet. It is provided with a division plate in the water chest so that one-half of the condenser may be cleaned while the other half is in use. This condenser is also equipped with two Wheeler air ejectors, either of which is capable of maintaining 26½ inches of vacuum in it, and with two motor-driven Warren centrifugal condensate pumps, one of which is a stand-by. The circulating water pump for this outfit is a 3000 gallon per minute Warren centrifugal pump, driven by a 27½-horsepower motor.

The boiler plant consists of four Babcock and Wilcox standard marine type water-tube boilers, located in one compartment with an athwartship fireroom, and connected to one elliptical stack. The boilers have a total heating surface of about 22,500 square feet, are fitted with interdeck superheaters having a total heating surface of about 2250 square feet, and generate steam at 350 pounds pressure and 230 degrees Fahrenheit superheat. They are fitted for oil-burning under either forced or natural draft, and are equipped with Diamond soot blowers. For the forced draft installation, which is on the closed ash-pit system, there are four American Blower Company's double width, double inlet fans, each rated at 10,000 cubic feet per minute and driven by a 7½-horsepower electric motor. These fans are located in the boiler room at the firing level, two on each side, and are arranged so that each boiler has its own forced draft fan; the discharge ducts are connected across the front of each battery of boilers and dampers fitted, so that in case of a breakdown of one of the fans the fan on the opposite side will serve two boilers. Todd fuel-oil burners, and Todd fuel-oil heaters are fitted. Other items in the fuel-oil plant are a separator tank built by the Newport News Shipbuilding & Dry Dock Company, which is really a heater set in the fuel-oil discharge line and is of sufficient capacity to allow any water or foreign matter to be settled

before the oil enters the burning system, one motor-driven Quimby screw-type service pump, one vertical duplex service pump, and one vertical simplex fuel oil transfer pump. The motor-driven service pump is normally used for sea duty and the reciprocating pump in port, but either pump has sufficient capacity for full power conditions. An Ingersoll-Rand motor-driven air compressor and tank is installed in the boiler room for use with the boiler tube soot blowers.

Complete arrangements have been made to ensure the purity of feed water. Only distilled water will be used and two special tanks are provided for that purpose, one in the boiler room and one in the engine room, the combined capacity being sufficient to fill two boilers to steaming level. The tank in the boiler room is arranged to receive water from the distilling plant and from the principal steam drains, and also to store the water from the boilers when the latter are emptied, hose connections on the boiler blow-offs being provided for that purpose. The tank in the engine room has two compartments, the upper one being used as the regular feed and filter tank, and the lower for distilled water for reserve feed. Two Davis Paracoil evaporators, each having a capacity of 47 tons in 24 hours, and one Davis Paracoil distiller having a capacity of 10,000 gallons in 24 hours are installed in the engine room.

For heating the feed water, two Alco Products, Inc., feed water heaters are arranged to operate in series and are capable of raising the temperature of the total feed water from 110 to 300 degrees Fahrenheit. The first stage heater is supplied with steam from the auxiliary exhaust line, supplemented by steam bled from one of the lower stages of the main turbines, and the second stage heater is supplied entirely by steam bled from the higher stages of the main turbines. A feed water grease extractor, supplied by Davis Engineering Company, is fitted in the discharge from the feed heaters. There are two Warren centrifugal main feed pumps, driven by Terry turbines, which are operated with super-heated steam only, and one Warren vertical simplex auxiliary feed pump which is operated with desuperheated boiler pressure steam.

For lubricating oil service there are two Westinghouse vertical centrifugal pumps of 200 gallons per minute capacity, driven by Westinghouse turbines, and two Griscom-Russell coolers each capable of cooling 120 gallons of lubricating oil from 142 to 107 degrees Fahrenheit per minute. The used lubricating oil is purified and reclaimed by means of a motor-driven De Laval centrifugal lubricating oil purifier, with which is connected a Davis vertical heater.

Engine room auxiliaries also include: one motor-driven centrifugal ballast pump with a Nash Hytor on an extension of the shaft; one vertical simplex pump for ballast and bilge service; one vertical duplex fire and bilge pump; two motor-driven centrifugal pumps for sanitary and fire service; and a reciprocating pump for handling oily bilge water; a 45-ton Bethlehem oil and water separator is provided, through which the oily bilge pump (and at option all the ballast and bilge pumps) discharge to avoid pollution of harbor waters. For fresh water service there are a reciprocating pump and a motor-driven centrifugal pump for cold water, and one motor-driven centrifugal pump for hot water. A Davis Engineering Company's heater is fitted for heating fresh water for service throughout the ship. All pumps not otherwise indicated are manufactured



The heart of the power plant of the Talamanca. At right, the two General-Electric turbo-generators. Above, the propulsion control board.



and supplied by The Warren Steam Pump Company and all motors are General-Electric manufacture.

An interesting feature of the whole installation is the number of special instruments for checking the performance of the machinery. These include a condensate meter for measuring the steam consumption of the two turbines; recording thermometers for stack temperature, feed water temperature, and turbine exhaust temperatures; and large dial gauges for the forced draft blowers which can be read from any point on the fireroom floor. All important temperature readings are recorded by Taylor Instrument Company's dial thermometers. These instruments are a part of the ship's equipment and indicate the careful study which the owners give to the economical operation of their ships.

Auxiliary Electric Plant

Three geared-turbine direct-current generating sets, each set having a five-stage turbine with reduction gears to reduce the revolutions from 4779 to 900 per minute, and a generator rating of 500 kilowatts with a voltage of 120 to 240 are installed. The turbines are designed for 310 pounds steam pressure at the throttle, and 230 degrees Fahrenheit superheat, but are suitable for operation at 350 pounds gauge. They are intended to operate normally with full boiler pressure superheated steam, but provision is also made for operation with desuperheated steam. Two of the sets are arranged for condensing operation only, and the other set for either condensing or non-condensing operation. The latter set is capable of carrying reduced load with 175 pounds gauge pressure and fifteen pounds back pressure. Two compound wound rotary balancer sets are fitted, each capable of supplying continuously 300 amperes neutral current for the 3-wire 120/240-volt lighting system and arranged for parallel operation. The auxiliary generating sets and the balancer sets were also furnished by the General Electric Company.

A new feature in connection with the direct current

switchboard is the provision for supplying from a single generator both the excitation bus and the general power bus when the demand for electric power is within the capacity of one generator. This is accomplished by tying the two buses together through a solenoid-operated, overload circuit breaker. The generator is connected to the excitation bus and current for excitation and propulsion auxiliaries is taken directly from this bus. Current for miscellaneous power and lighting is taken from the general power bus which, in turn, is fed from the excitation bus through the bus tie circuit breaker. In case of overload on the general power system, the bus tie breaker automatically opens, relieving the generator of the load and leaving the excitation and propulsion auxiliary power uninterrupted. A system of electric interlocks between the bus tie circuit breaker and the generator switches and circuit breakers enables shifting from single generator to multiple generator operation and vice versa without interruption of service.

For the accurate measurement of power used in the various direct-current auxiliary circuits, this switchboard is equipped with Sangamo watt-hour meters.

A 25-kilowatt General-Electric generator for emergency lighting driven by a Weir-Kilby gasoline engine, is located in a steel-enclosed compartment in the officer's deck house on the boat deck. In the same room there is a 120-volt Gould storage battery which is primarily for radio supply, but is of sufficient capacity to also supply the emergency lights for at least one-half hour. Storage batteries are also provided for electrical interior communication systems and separate batteries for the fire alarms. A motor generator set is provided for the gyroscopic compass system.

Sea Trials

On December 1, the Talamanca was given an all-day sea trial off the Virginia Capes, during which speed and economy runs were made between Chesapeake and

Winter Quarter Light Vessels, a distance of 67.5 nautical miles. One run was made in each direction, the average speed obtained being 19.46 knots and the average shaft horsepower developed 11,150 at 129.5 revolutions per minute. The speed on the trial run was taken by observation and also by means of the pressure log which has recently been developed at the Washington Model Testing Basin. The results by the two methods were in remarkably close agreement and help to confirm the belief that the pressure log is quite a reliable means for determining ship's speed.

In addition, two short runs were made with one generator supplying current to both motors. The average draft on the trials was about 20 feet, and from the results it is calculated that the vessel will be able to maintain a speed in excess of 18 knots at service draft. This gives considerable margin over the guarantee of 17½ knots, so that the vessel will easily maintain the rigid schedule required of vessels in the fruit carrying trade.

Talamanca represents the very highest standards in her type and has no superior in her class. Especially is this true of the refrigerating system and the propulsive machinery, in both of which many new ideas developed by H. H. Robson, general manager of the Marine Department of the United Fruit Company, and his staff, have been carried out. In the operation of the large fleet of vessels under his charge Mr. Robson has made a remarkable record in reducing fuel consumption and increasing all-round efficiency, and his wide experience with the requirements of the service qualify him to determine just what is required to make a thoroughly satisfactory and efficient ship in such a specialized trade as fruit carrying. All indications are that the Talamanca and her sisters will prove to be a distinct advance over any ships heretofore built for that trade.

Crew Accommodations

In confirmation of the owner's belief that all-round efficiency depends as much on the personnel as on the equipment, particular care has been paid to providing comfortable living quarters for officers and crew. Individual staterooms are provided for each of the deck and engineer officers, and in each of the rooms single metal beds are fitted, the same as in the passenger staterooms. All these rooms have practically the same conveniences as the regular passenger staterooms, with the same provisions for making them comfortable in both hot and cold climates. A large comfortable lounging room for the engineers is another of the provisions made for the comfort of the operating personnel. The quarters for all deck and engineer officers are located in steel deck houses on the boat deck; those for the steward's department are all on the starboard side of the upper deck amidships; and the remainder of the crew are in the poop. A separate electrically equipped galley for the crew is located in the poop.

Hull and machinery were built under special survey of the American Bureau of Shipping, in accordance with plans approved by them to special class A.1.E "with Freeboard" in their Register. The classification includes the hull, propulsive machinery, electrical plant, refrigerating plant, and equipment.

The vessel also meets all requirements of the United States Shipping Board and, through them, of the Navy Department, these including compliance with all applicable regulations of the International Convention for Safety of Life at Sea (1929), and some additional

ones. Complete rat-proofing is one of the latter, and this and other requirements of the United States Public Health Service, such as the complete segregation of all fresh water for domestic use from all other fresh water, have been carried out.

All design details of the hull and machinery, as well as the actual construction of these vessels, under the efficient general supervision of Captain D. H. Young, Superintendent of New Construction of the United Fruit Company, who has, for many years, supervised the construction of all the vessels built for that company and has particularly intimate knowledge of their requirements. Associated with him in this work is his capable assistant J. V. O'Sullivan. The chief resident inspector for all three vessels building at the Newport News Yards is T. B. Selkirk.

Improvements Suggested for the Administration of United States Steamboat Inspection Service

The passing on plans of hulls and boilers by a staff of experts at the central office in Washington in lieu of the present system of examination of the completed work by field inspectors is urged by Supervising Inspector General D. N. Hoover, United States Steamboat Inspection Service, in his annual report.

A high standard of ship construction was adopted at the Conference of Safety at Sea in London two years ago, but this convention has yet to be ratified by the United States Senate. If the London convention is not ratified by this country, it will become necessary for the Steamboat Inspection Service to formulate regulations that will obtain the highest standard of construction in the subdivision of ships. In either event, it will be necessary to have stationed in the central office technically qualified men to work out the regulations formulated, and to check their application.

Modern developments have made it necessary from time to time to amend the existing statutes covering boiler construction and inspection. At the present time, a new code is being formulated which should be completed before the end of the 1932 fiscal year. When the necessary legislation is enacted to make this code workable, the regulations covering boilers and machinery in the United States will be second to none. Operation of the new code will make it desirable to have the boiler plans reviewed in the central office.

Referring to the examination of ships' officers, better results would be obtained if these examinations were reviewed by the central office in Washington. Under the existing system, incorrect action by the local boards can be remedied only by appeal to Washington and the central office should be in a position to know that all original action was correct.

6526 vessels were inspected and more than 100,000 tests were made in connection with marine boilers. In addition, large numbers of life-preservers and other apparatus were inspected, 24,000 ships officers were licensed, and certificates issued to more than 6000 able seamen.

How well the safety of passengers by sea is safeguarded in this modern era is indicated by the striking fact that during the last fiscal year more than 4,000,000 were carried in safety for every life lost. During this period approximately 1000 lives were directly saved by means of the life-saving appliances required by law.

British Shipbuilding in 1931

By R. C. W. Courtney

FROM many points of view the year 1931 will be always remembered as one of the most depressing in the annals of British shipbuilding, not only on account of a dearth of new contracts but because it has coincided with various other unpleasant features, such as the general political situation and the financial difficulties of certain prominent shipping companies associated with the Kysant group. These concerns have, of course, been prevented from giving further orders, at least for the time being, and with the launching of the White Star liner *Georgic* and a 14,200-ton Nelson liner only one large passenger ship, the new Cunarder, is left on the stocks.

The most noteworthy British ship completed during 1931 was, of course, the Canadian Pacific liner Empress of Britain, which has proved remarkably successful in service and has steadily lowered the passage time between Europe, Canada, and the Middle Western States. The main features from a technical point of view are centered round the steam generating plant, as the 62,500 designed shaft horsepower is normally provided for by nine water-tube boilers, of which one is generally held in reserve. Eight are of the Yarrow five-drum double-flow side-fired type with a working pressure of 425 pounds and 725 degrees Fahrenheit final temperature, the total generating heating surface being 99,550 square feet. The ninth boiler is the invention of John Johnson, the owner's chief superintendent engineer, and consists of two large-diameter drums placed vertically, one above the other, and connected by curved tubes longitudinally and across the ends, so that the combustion chamber is practically enclosed by water tubes. The heating surface is 6841 square feet and the combustion chamber capacity is 1117 cubic feet, whilst the weight with steam up, including the air heater, is 166 tons as compared with a corresponding weight of 241 tons in the case of the Yarrow boilers. A 12 hour economy trial of this ship gave an oil fuel consumption for all purposes of 0.57 pound per shaft horsepower per hour, and from the special tests carried out in the meantime with the Johnson boiler it is anticipated that other important advances may be expected in the near future.

Mention has already been made in *Pacific Marine Review* of the new Peninsular and Oriental turbo-

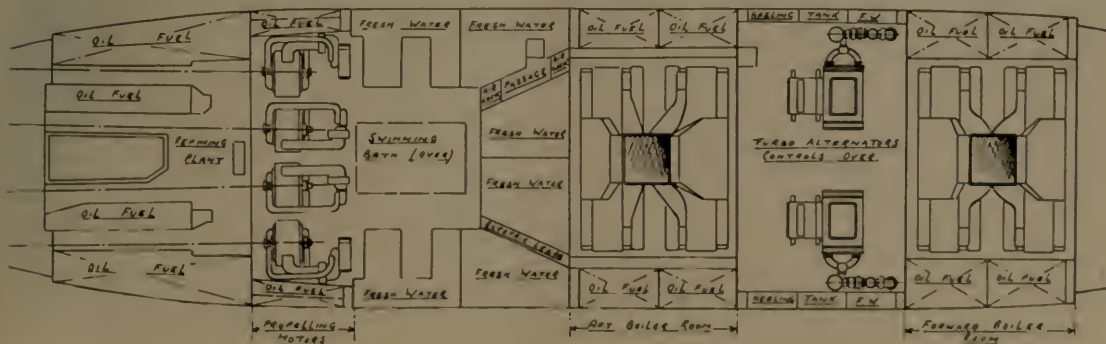
electric liners Strathnaver and Strathaird for the Australian service via Suez. The first of these ships has now entered service after highly successful trials, during which a top speed of just over 23 knots was registered, and whilst detailed fuel consumption figures are not yet available it can be stated that from 85 to 162 tons of fuel are consumed per day with the speed varying between 16 and 20 knots. Dimensions are 664 feet overall by 80 feet by 46 feet 6 inches molded, with a gross tonnage of 22,547 and load displacement of 27,556 tons on 29 feet 2 inches. The propelling plant consists of turbo-alternators and motors having a normal rating of 28,000 shaft horsepower supplied by the British Thomson Houston Company. Four Yarrow high-pressure boilers supply steam at 425 pounds per square inch pressure and 725 degrees Fahrenheit. With two of the boilers and one turbo-alternator only in use a speed of from 15½ to 16 knots is easily maintained.

Two other noteworthy vessels have also been constructed for the P. & O. Company in the 14,000 ton Corfu and Carthage for express service to the Orient via Suez. Built on the Clyde by Alexander Stephen & Sons, these ships have the following dimensions: 545 feet over-all length, 71 feet beam, and 46 feet molded depth. The displacement on 29 feet 9 inches is 15,000 tons, and provision is made for 180 first and 200 second class passengers in addition to a considerable amount of cargo. Propulsion in this instance is effected by twin sets of single-reduction Parsons turbines collectively developing 15,000 shaft horsepower for 19½ to 20 knots and using high pressure steam at 400 pounds pressure and 752 degrees Fahrenheit.

Another noteworthy vessel completed by the same builders for the P. & O. Company's allied concern, the British India Line, is the 16-knot *Karanja*, which, with her sister ship *Kenya*, commissioned at the end of 1930, is designed for service between India and South and East African ports. These vessels are just under 10,000 tons gross, with dimensions 487 feet over-all by 64 feet by 41 feet, and the power plant consists of single-reduction, geared turbines with seven oil-fired Scotch boilers supplying steam at 250 pounds and 600 deg. Fahrenheit.

The turbo-electric Furness liner *Monarch* of Bermuda has also completed very satisfactory trials and

TURBO-ELECTRIC LINER "MONARCH OF BERMUDA". LAY OUT OF POWER PLANT.



should prove very popular in the New York-Bermuda service. The ship has been constructed at the Tyne-side yard of Vickers Armstrong, and has a load water-line length of 576 feet, a beam of 76 feet 6 inches, and molded depth of 43 feet 3 inches, the gross tonnage being 20,500 and the sea speed 20 knots. The propelling units consist of four General Electric motors each rated at 4650 shaft horsepower, 150 revolutions per minute, with current supplied by two 7500-kilowatt turbo-alternators. Four 750-kilowatt direct - current generators are installed for the ship's lighting and hotel services, each being driven through gearing at 750 revolutions per minute by a turbine running at 6000 revolutions per minute. There are eight Babcock and Wilcox marine water-tube boilers working under the closed stokehold system of forced draft and generating steam at 400 pounds and 650-675 degrees Fahrenheit.

Important motorships delivered include the Reina del Pacifico, Warwick Castle, and Achimota from Harland and Wolff's yards. The two former have already

been described in these pages; the latter is a 10,000-ton passenger liner for the Elder Dempster line service between Liverpool and West Africa, completion of which has been seriously delayed owing to the first set of machinery being lost whilst on transit from the Clyde to Belfast.

The new White Star liner Georgic, now being fitted out by the same builders, will be an improved Britannic.

Delivery has also been effected of several whaling factory ships. A typical example is the Vestfold, built by the Furness Shipbuilding Co. of Haverton Hill-on-Tees for Norwegian owners, with dimensions of 550 feet by 74 feet 3½ inches by 48 feet 9 inches, and a maximum deadweight of 22,000 tons. Propulsion is by twin sets of quadruples having cylinders 20½ inches, 29 inches, 42 inches, and 62 inches, by 45-inch stroke with five oil-fired single-ended Scotch boilers working at 265 pounds under the Howden system of forced draft; and the equipment includes extensive apparatus for extracting and refining whale oil.

Ship Safety Organization

By Arthur R. Bush*

Past Chairman, Marine Section, National Safety Council

THE basis of an efficient marine safety organization is personnel and not a mere skeletonized program of projected activities. Success will come only insofar as it is endowed at inception with the qualities of success. And these I would enumerate as follows:

1. The selection of a capable executive for the sole control and direction of all accident prevention measures. In the appraisal of qualifications, personal attributes are accorded the greatest weight. He should be a convincing speaker, wield a persuasive pen, possess a commanding personality, and above all have a pronounced ability for working harmoniously with his associates. Regardless of all other virtues, I stress this latter as of first importance. Leadership consists of nothing more than inducing cooperation to a common end. That he has had actual experience at sea or a thorough knowledge of the economics of ship operation is assumed.

2. Clothe him with the necessary authority within, of course, well defined limitations. Give him to understand that he is held responsible for results and that he may rely on the unstinted support of the management.

3. Inaugurate safety committees on each vessel of the fleet, consisting of the master as chairman, the chief engineer, the steward, a seaman, and a fireman, the master, engineer, and steward to remain as members during their attachment to the ship, the seaman and fireman being rotated every three or six months. A secretary should be appointed by the master.

The committee, accompanied by the secretary, will make a weekly inspection of the ship, carefully noting and recording all hazardous conditions and practices. These will be considered and corrective steps taken at the regular monthly meeting.

In instances where immediate action is called for, the committee has power to decide. At the monthly session the secretary will present a prepared memorandum of the items which the inspection uncovered

and incorporate in the minutes each item and its disposition.

Each accident on board ship will be investigated by the committee, interviewing the injured where their condition permits, and their conclusions and recommendations to preclude a recurrence will form a part of the official report on the form provided to the safety supervisor; all reports to be issued by the secretary and approved by the master.

In addition, the secretary will see to the periodical changing of posters on bulletin boards, according to a schedule, and assuming such other duties as may be assigned to him by the master, as chairman, from time to time.

4. Create a permanent general or shore committee representative of the operating, engineering, claims, and stewards departments, the safety supervisor acting as chairman.

At the monthly meetings (to assemble less frequently is ineffective) they should pass upon all matters which the rules and regulations require ships' committees to so refer. Approval or rejection should be prompt and seldom deferred. In cases where disapproval seems merited, the ship committee is to be notified, the reason stated, and a request made to amplify their recommendations with additional data. If, upon reconsideration, the general committee elects again to reject, the decision becomes final.

The minutes of the ships' committees are to be read at each meeting of the general committee, thus to keep fully informed of the fleet's safety activities.

Each accident report to be read, reviewed, and the recommendations of the ship's committee considered and the action taken noted. At each meeting the safety supervisor will present a detailed report—a copy to each member—of the results of the month preceding and a comparative analysis of individual ships. Composite reports to be prepared quarterly.

Safety is cooperative, mutually inclusive, from the highest to the lowest. Everyone is concerned, everyone must do his part. To prevail upon them to do so is an educational not an engineering problem.

*Abstract from an address delivered at the Twentieth Annual Safety Congress at Chicago.

The Fibreboard Case Afloat

Part II—Minimizing Damage Claims

INHERENT or built into the standard fibreboard case (as approved for marine shipments by the Export Fibreboard Case Association), there are a number of features that tend to minimize damage to the case and its contents. Among these are:

- The absence of nails,
- The absence of metal straps or wires,
- The absence of splinters,
- The use of weather-proof fibreboard,
- The use of mineral glue (silicate of soda) as a binder in the fibreboard and as an adhesive in the sealing of the flaps,
- The tightness of the case compared with other packages.

Each of these features has a bearing in the handling or stowage of commodities and, taken in the aggregate, their combined influence has led to the practical elimination of some sources of damage claims and the minimizing of others.

The effect of the first three features in the list might be summed up in the phrase—"Safe, easy hand-

A type of sling used by British steamship companies for handling fibreboard cases on skids.



ling." Nails (not driven home, worked loose, or with heads tilted or broken off) are sources of many painful and sometimes dangerous scratches, and, therefore, the cause of many dropped and damaged boxes. The same is true of metal straps that get twisted or may be improperly fastened, leaving protruding and ragged ends to injure the stevedore and or the other boxes in the pile. Splinters are even more dangerous in the same way. These three fruitful sources of both personal and property damage claims are practically eliminated by the fibreboard case.

Of even greater importance, possibly, is the weather-proof quality of the fibreboard used in making these cases. This greatly aids in eliminating the sweat damage which has been such a problem in the shipment of Pacific Coast canned goods, intercoastal and direct European. Beads of sweat will form on the outsides of the case and run off for long periods of time with no dampness reaching the interior. Export fibreboard cases have been subjected to a deluge of water from a fire hose over considerable periods with no appreciable moisture reaching the interior.

The use of mineral glue as a binder and an adhesive has a very important result in the discouragement of rodents. The soft paper of the labels, the vegetable or animal glue which it is necessary to use for adhesive between tin and paper, and raisins either in bulk or cartons are all very appealing as foodstuffs to a ship's company of rats, yet in more than two years' use of the present approved fibreboard case not a single complaint of rat damage has been filed on shipments in fibreboard. Since many of the ships carrying these shipments are known to have much rat damage to other portions of their cargoes, the Export Fibreboard Case Association has concluded that rats are averse to (water-glass) silicate of soda. Experiments are now going on to determine if rats can be tempted to chew through an Export Fibreboard case and what effect such chewing would have on the rats. A standard E. F. C. A. case, loaded with delectable tit-bits of cheese, is being exposed in rat infested situations.



Unloading California products in E.F.C.A. cases from a lighter at a British port.

(Please turn to Page 19)

With the Naval Architects and Marine Engineers

*Abstracts of the Papers Read Before the Thirty-Ninth General
Meeting of the Society at New York, November 1931*

SEVENTEEN instructive and interesting papers were read before the November meeting of The Society of Naval Architects and Marine Engineers. The broad fields of hull design and hull construction were fairly covered with twelve papers; three were devoted to marine engineering, one to interior lighting, and one to the giant dirigible Akron.

The twelve hull papers can, for convenience, be considered under four subheads; namely, Hull Materials, 5 papers; Hull Construction, 3 papers; Model Test and Trial Data Analysis, 3 papers; and The Design of Super-Liners, 1 paper.

Hull Materials

Investigation of Structural Characteristics of Destroyers Preston and Bruce, by Lieutenant-Commander C. C. Kell, U.S.N.

The two destroyers Preston and Bruce, along with many others, were consigned to the scrap pile in the recent program, and the Naval Bureau of Construction and Repair decided to use them for structural research by testing them in dry-dock, one for hogging, the other for sagging.

In the sagging tests, the Preston was supported at frames 7 and 170 by cradle plates hung from steel shafts swung in bearings resting on steel towers. These shafts were carried right through the hull and structural steel tubes six inches larger in diameter than the shaft held the upper ends of the cradle plates in position. All load was taken on the keel and adjacent reinforced shell plating. At the forward cradle the shaft bearing was hung in a pendulum type support allowing the shaft to move forward and aft with the changes in length due to sagging and to temperature changes. Complete measurements of both transverse and longitudinal strains were taken at a predetermined system of strain gauge stations covering all important strength members of the hull. By ballasting and changing the water level in the dock with the keel held clear of the keel blocks by the end cradle supports, it was possible, with this experimental set-up, to produce any given sagging strain from that incidental to normal flotation in still water to that producing complete failure of the hull structure. Step by step these sagging strains were imposed; and careful, complete measurements were taken at each step until the complete failure of the hull under strain was reached.

In the hogging tests, the hull of the Bruce was supported by two box girders 36 feet 9 inches apart on centers, carried through and rigidly attached to the hull at the height of the theoretical neutral axis and resting on soft wood blocking supported by steel towers. Following the same general method as in the sagging tests, the hogging loads were brought gradually step by step to the point of failure, and at each step complete strain measurements were taken.

Great care was taken to keep all conditions constant during the taking of data at any one stage of both sagging and hogging experiments. The paper gives complete details of data and is copiously illustrated with cuts made from the photographic records of the apparatus and of various effects of sagging and hogging stresses.

Determination of Stresses in Plating from Strain Measurements

, by Professor William Hovgaard.

The tests on the Preston and Bruce, described in the above paper, were made the subject of the thesis of the students in Naval Construction of the graduating class of the Massachusetts Institute of Technology. These students made a complete analysis of the results. This paper by Professor Hovgaard presents and explains the formulas covering the Theory of Elasticity in a form convenient to naval architects and applied to the specific case of strain measurements in ship plating. These formulas in this form were used by the Naval Construction students in their analysis of the results of the tests on the Preston.

Recent Developments in Special Quality Steels for Shipbuilding

, by William Bennett.

After outlining the history of the use of iron and steel in shipbuilding from 1819, when an iron vessel, the Vulcan, was built near Glasgow, down to the Mauritania and Luisitania, 1907, in which large quantities of high tensile silicon steel were used, the paper takes up the question of special high elastic limit mild steel as used first on the Prometheus, built throughout of this material in 1925. A number of special modern alloy steels applicable to shipbuilding are discussed in detail as to their composition, characteristics, and application. Typical cases of the use of these steels in modern vessels are detailed. Among these vessels are the Vulcanic, Bremen, Empress of Japan, Empress of Britain, and the Monarch of Bermuda.

Notes on the Development of Certain Materials Used in Ships of the United States Navy

, by Rear Admiral George H. Rock, U.S.N.

In writing specifications for materials for shipbuilding, two considerations govern: "the first, characteristics desired; the second, characteristics commercially available. Often the ship designer treads on the heels of the manufacturer of materials in his demand for new or improved characteristics; often the materials man is ahead of the designer and must 'sell' to him the new and different characteristics; often, due to the failure of the ship designer to make known his needs, use of old materials continues when improvement readily could be made."

With this preface, the paper takes up in detail the development of various materials and specifications as

used in the United States Navy and particularly as developed due to the demands imposed on naval materials by the displacement limitations of recent treaties. Among these materials are structural steel, corrosion resisting steel, paints, heat-insulating materials, bunting for flags, anchor chain, deck coverings, aluminum furniture, manila rope, and steel castings.

Rear Admiral Rock has presented a number of valuable papers on this general subject.

Shipbuilding

Some Recent Developments in the Shipbuilding Art in America, by John Woodward.

The free interchange of information among shipyards and the undertaking of new lines of work by many of the yards during the shipbuilding depression, coupled with the necessity for reducing costs and for meeting the higher standards of comfort, safety, and economy made by the modern ship operator, have led American shipyards during recent years into many improvements and developments in all branches of shipbuilding practice and especially along the following lines:

Materials Handling: Light overhead electric ganties are displacing locomotive jib cranes at the sub-assembly skids. Tower whirler cranes of high speed and capacity are found very economical and speedy over the shipways. Tractors and fleets of trailers are being used for distribution of lighter materials.

Hull Construction: There is a definite tendency to depend more on mold loft work and less on lifted work for the development of plating. Paper is largely displacing wood for templates. The laying off of plates and shapes by groups of specialists in this work speeds up assembly. Subassembly of such parts as floors, frames, girders, bulkheads, casings, trunks and fantail sterns on skids, properly served by cranes and tools, shortens the erection period on the ways, increases the rivet drive, improves inspection, decreases cost, and increases shipyard capacity.

Erection: Steel stage poles are gradually displacing timber, being more economical in the long run and giving a safer and better working platform.

Assembly: Great advances have been made in pneumatic tools for riveting and (both piston and rotary types) for drilling, reaming, countersinking, and power bolting. The use of hydraulic riveting is increasing. Improved management planning for rivet drive economy takes the line of insuring to each gang uninter-

rupted work ahead, eliminating odd rivets, keeping all requirements of rivets, coke, oil, tools, and die properly inspected and supplied as needed.

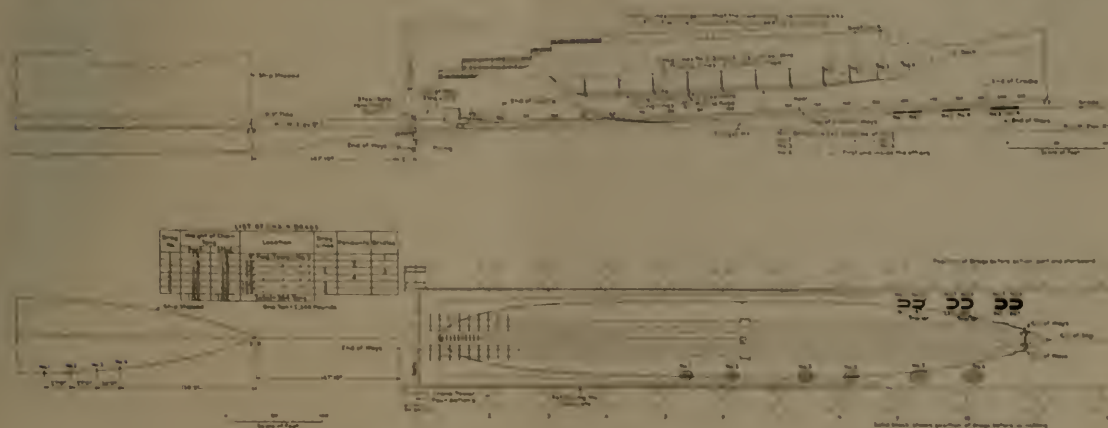
Machinery Construction and Installation: The evolution in propulsion machinery has brought about many changes in shop practice in shipyards. Drop forgings, electric welding, high speed steel, the cold saw, automatic machine tools, and the cutting off torch are some of the methods and tools mentioned as contributing to the advance in shipyard shop practice. The introduction of high pressure steam has led to many improved methods of handling pipe fabrication and installation.

Outfitting: The principal progress in joiner work, particularly on large passenger vessels, has been in doing more work in the shop from carefully prepared detailed drawings and less on the ship. Combined with the maintenance of a large warehouse for storing finished joiner work, this plan helps greatly in stabilizing shipyard employment and in facilitating progress of construction on the ship. The same idea applies to ship plumbing and electrical installations. The use of paint sprayers results in considerable savings.

Management: Shipyard management can effect great savings by more careful planning of the orderly progress of construction; more economical administration of material inventories; by the establishment of intelligent accident prevention programs; by the maintenance of clean and orderly conditions in the yard; and by the adequate training of apprentices in the various branches of modern shipyard practice. The author concludes with a plea for more free interchange of information and ideas both within the Society and among the shipyards. John B. Woodward is assistant general manager of Newport News Shipbuilding & Dry Dock Company.

Notes on the Launching of the T.S.S. Mariposa, by James B. Hunter.

The steamship Mariposa is 631.5 feet long on load water line. From the end of the ways to the opposite bank of the channel into which she was launched the distance is about 800 feet. Launching weight was 12,000 tons. Some problem! Former experience with the airplane carrier Lexington, a heavier hull, and the scout cruiser Northampton, a lighter hull, enabled experts at the Fore River Plant of the Bethlehem Shipbuilding Corporation, Quincy, Massachusetts, to figure to a nicety the exact chain drag required to stop



Diagrammatic elevation and plan of the launching arrangements for the liner Mariposa.

the hull safely; and the launch went forward on schedule and with all movement of the hull practically as estimated. The arrangement and removal of blocking and the construction of cradles and trigger are given in detail. The illustration herewith shows the arrangement of chain drags, drag ropes, and tricing lines and the position of the hull after stopping. This is an excellent demonstration of the efficiency of properly estimated and applied chain drags.

Arc Welding in Shipbuilding, by H. W. Pierce.

Welding has become almost indispensable in ship repairs and in the construction of modern steam boilers, but its progress in new hull construction has been slower than ordinary conservatism should warrant. The welding connection properly designed and executed is as good or better than riveting. No claim is made that welding should supplant all riveting in a shipyard, but that welding is such an excellent tool for reducing shipyard costs that shipbuilders should carefully analyze its merits and should change their designing and construction practice sufficiently to take full advantage of all its benefits. Mr. Pierce is assistant general foreman, Hull Department, New York Shipbuilding Company.

Marine Engineering

Recent Developments in Electrical Propulsion, by Es- kil Berg and Charles F. Bailey.

After reviewing the progress to date of the turbo-electric drive for merchant vessels, culminating in the trial data of the Dollar liners President Hoover and President Coolidge and recent European installations, this paper analyzes a tentative turbo-electric drive installation of 145,000 normal shaft horsepower and 180,000 maximum horsepower, which is proposed for the American super-liner claiming as low or lower machinery weights, equal or better fuel economy, and lower maintenance costs than for geared turbine drive.

There are seventy-three turbo-electric drive ships of various classes now in service, aggregating about 1,135,000 shaft horsepower. The total fuel consumption on all of these vessels has been uniformly less than expected. Eskil Berg is assistant consulting engineer, General Electric Company. Charles F. Bailey is engineering director, Newport News Shipbuilding & Dry Dock Company.

Electric Auxiliaries on Shipboard, by W. E. Thau.

In three parts. Part I. Analyses of steam-driven and electric-driven engine room auxiliaries on Case A, a 5000 shaft horsepower single-screw cargo vessel; Case B, a 30,000 shaft horsepower twin-screw vessel. Part II. Analyses of deck auxiliaries. Part III. Special means for increasing economy of auxiliary generating plant as—increasing generator efficiency, dual drive system, attached generator, and diesel-driven generators.

The author concludes in summary that electric auxiliaries pay for themselves; provide better working conditions for crew; afford better comfort for passengers and crew; will become lower in first cost and more advantageous as they are more frequently used; makes plea that operators keep more accurate data on auxiliary operation costs. W. E. Thau is director of marine engineering, Westinghouse Electric & Manufacturing Company.

Model Experiments to Determine the Effect upon Resistance of Variations in Length of Entrance, Beam, and Rise of Floor, by Professor Edward M. Bragg.

The University of Michigan made a series of tests on 19 models for the Shipping Board in 1919. As the re-

sult of these tests, Model No. 1130 was selected as an economical hull model for cargo ships. The present paper covers a recent series of tests on variations of this model. The variations cover ranges of from 20 to 50 per cent. entrance; from 30 to 45 per cent. run; from 44.25 to 65.4 feet beam; and from 5.65 to 73.4 inches dead rise of floor. Model used was 9.66 feet long on load water line and represented a 425-foot ship. Results of all tests are presented in graph form and, with the former series on the same model, they constitute a very comprehensive and valuable contribution to ship model towing tank literature.

Edward M. Bragg is professor of Naval Architecture and Marine Engineering, University of Michigan.

Model Steering Tests, by L. F. Hewins and Lieutenant W. P. Roop, U.S.N.

A description of some tests made at the United States Experimental Model Basin, Navy Yard, Washington, D.C., and a presentation of some of the data obtained therefrom. The models used in these tests and the method of operation simulated as closely as possible the actual conditions of flow about the stern of a turning ship and the data obtained show "rather close correlation with full scale data," enough to give "confidence in calculating reactions on the full scale rudder by reference to the model data." This correlation is shown by the curves herewith.

Systematic tests will be carried on with the apparatus developed for this purpose and it is hoped that data will be developed over a wide range of conditions which will be very valuable in future design of rudders, stern lines, and steering engines. L. F. Hewins is with the United States Experimental Model Basin.

On the Analysis of Ship Trial Data, by Karl E. Schoenherr.

The increasing attention given during recent years to the comparison between ship trials and the model test induced the author of this paper to work out and present to naval architects a method of mathematical

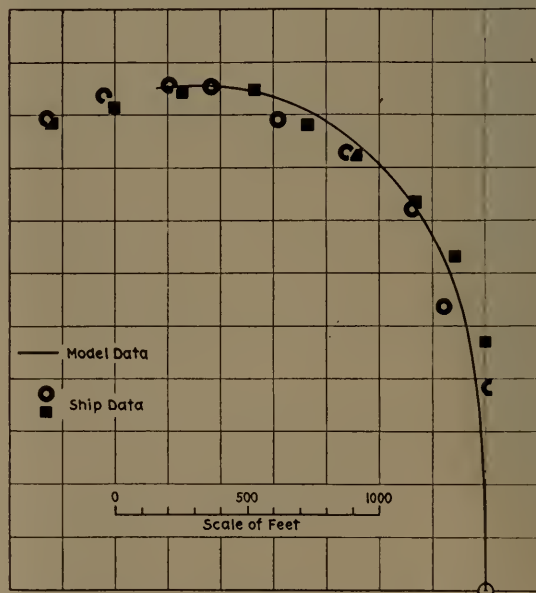
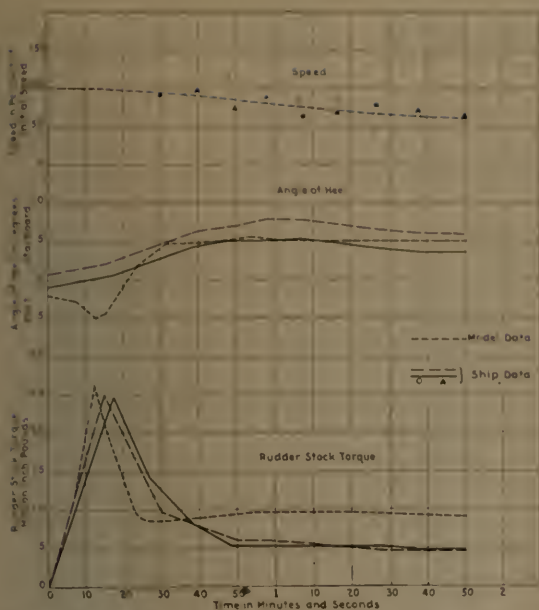


Diagram showing the correlation between the turning circles of the model and of the actual ship.



Diagrams showing the correlation of steering data obtained from model experiments and from tests of the actual ship.

analysis of ship trial data whereby the effects of wind, weather, and tide (always present on the ship's trial and absent on the model test) may be "reliably estimated and eliminated before making such comparisons." Karl E. Schoenherr is connected with the United States Experimental Model Basin.

American Super-Liners

Design of American Super-Liners, by Theodore E. Ferris.

This monumental paper describes the designs (now approved by the American Bureau of Shipping, Lloyds Register of Shipping, the United States Shipping Board, and the United States Navy) for two super-liners which were prepared for the former organization of the United States Lines by Theodore E. Ferris in co-operation with a committee composed of John E. Burkhardt and Hugo P. Frear, respectively chief engineer and consulting naval architects of Bethlehem Shipbuilding Corporation; Charles F. Bailey and Harold F. Norton, respectively, engineering director and naval architect of Newport News Shipbuilding & Dry Dock Co.; Ernest H. Rigg and Mayson W. Torbet, respectively naval architect and chief engineer, New York Shipbuilding Company. Two designs were submitted; first, a geared turbine drive on four screws, 180,000 shaft horsepower, 945 feet long on water line, 107 feet 10-1/8 inches beam; 59,880 tons displacement on 36-foot draft; 56,000 gross tons. Second, a turboelectric drive on four screws, 200,000 shaft horsepower, 965 feet long, on water line, beam maximum 108 feet 4-1/8 inches, 63,040 tons displacement on 37 foot draft, gross 60,000 tons, speeds at two-thirds power 27 1/2 knots, full power 30.5 knots.

Full detail schedules of equipment, general arrangements, detail half section, detail stern frame and stem, analyses of both types of propulsion machinery, stability diagrams and analysis thereof, analysis of operation in the North Atlantic service, and program

for interior decoration are all thoroughly covered by Mr. Ferris. The first-class passenger accommodation takes care of 1050 persons with 71 square feet stateroom area per passenger. Tourist class takes 950 passengers with 25.3 square feet stateroom area per passenger. Over \$1,500,000 is allotted for cost of decoration of first class public rooms.

This paper is a great contribution to ship design literature and will be very valuable as a reference work whether or not the ships described are ever built.

Ship Lighting

Interior Lighting Aboard Ships, by Samuel G. Hibben.

An interesting and very well illustrated paper was presented describing some of the more recent applications of electric lighting aboard ship for practical and decorative illumination, together with some suggestion to the marine electrical engineer as to new possibilities for beauty and economy in the selection and installation of electric lamps and lighting fixtures. Samuel G. Hibben is manager, Commercial Engineering Department, Westinghouse Lamp Company.

U. S. Airship Akron

Some Features of a Modern Airship, by Commander Garland Fulton, U.S.N.

A paper outlines airship progress in the United States, describes the design and construction of the giant airship Akron, abstracts United States Navy technical specifications for rigid airships of the Akron type, declares "In final analysis, airships, whether military or commercial, are just another means of transportation. As such they have no quarrel with steamships, trains, or airplanes. Each has its role to play and there is no reason for one to interfere with the others."

Export Fibreboard Case Afloat

(Continued from Page 15)

This has been tried for some weeks, but no rat seems willing to take a chance. We may assume, then, that the rat problem is solved by the fibreboard case. The silicate of soda acts as a deterrent also to boring insects.

But what about the human pilferer? The fibreboard case may be easily and neatly opened, but to the amateur pilferer or the occasional light fingered stevedore it is not so easily closed without showing very evidently that it has been tampered with. The testimony of the ship operators is that this feature of the use of fibreboard cases enables them to easily detect and to take measures to curb petty pilferage in handling.

The carton-like tightness of the fibreboard case is valuable in minimizing liability to contamination from objectionable odors or from vegetable mold or other fungus growth.

Another way in which this case saves ships' time is in the facility with which it may be opened for inspection and sealed again as good as new by the customs inspector who is properly equipped to handle fibreboard. Service men on the staff of the Export Fibreboard Case Association at principal ports are giving special attention to this work in their contact with dock workers and Customs Inspectors.

All of these features, therefore, combine to produce a package that, while it saves revenue-earning weight and space for the shipowner, cuts down his handling costs and minimizes his damage claims.

Pumps for Marine Service

By I. W. Jackman,* O. H. Dorer, H. M. Chase**

Part I—General Considerations

THE selection of pumping equipment for the modern ship requires a more careful study of the actual operating conditions than it did a few years ago. The more common steam pump of the past, with its wide range of capacities and pressure ratings, required less accurate selection than the modern motor-driven centrifugal with its limited range of flexibilities.

Higher pressures, larger capacities, and the demand for greater economy now require careful consideration of the type of pump and its prime mover. This paper deals only with pumps handling liquids as distinguished from those handling air or noncondensable vapors.

Pumps can be generally classed into four groups: (a) Centrifugal, (b) power (reciprocating), (c) steam (reciprocating), (d) rotary. Under each of these classes there are certain general limitations.

(a) Centrifugal pumps are generally suitable for water but can be used for light oils and gasoline. They are suitable for low and medium heads, medium to large capacities. They are particularly adapted to high speeds which speeds are necessary if accompanied with high heads. They are not economical for small capacities and high heads.

(b) Power pumps of the reciprocating type are generally suitable for all kinds of liquids and especially for small and medium capacities with high heads. They are not economical for large capacities with either low or high heads.

(c) Steam pumps are generally suitable for all liquids, small or medium capacities, and for all head conditions. They are not suitable for large capacities and low heads.

(d) Rotary pumps are generally suitable for oil and other viscous liquids having lubricating value, good for all capacities and heads up to 350 pounds. They should be operated at slow speeds to insure smooth, quiet operation and high mechanical efficiency.

The selection of a pump should also be governed by the type of vessel and the time factor that the pump is in operation. A pump that is in use a large percentage of the time should be selected for its economy, while one that is seldom used can be selected for its low price, economy being a negative factor.

A cargo and passenger vessel will be at sea approximately 50 per cent. of the time, while a tanker will be at sea over 90 per cent. of the time. Yachts, pleasure crafts, excursion boats, etc., will be at sea only 5 to 10 per cent. of the time.

The accompanying table gives a characteristic list of pumps on a steam-driven cargo and passenger ship or tanker.

The four general classes of pumps listed in the table can be further subdivided into horizontal and vertical. The choice between these two types again is dependent on the type of vessel and service factor, together with a consideration of space available and foundation cost. A horizontal pump normally costs less but

Item No.	Name of pump	Operating time, %	
		Cargo and passenger	Tankers
Condenser Pumps:			
1	Main circulating	50	90
2	Main condensate	50	90
3	Main condensate standby	2	3
4	Auxiliary circulating	50	10
5	Auxiliary condensate	50	10
Salt Water Pumps:			
6	Sanitary	95	95
7	Fire	3	1
8	L. O. cooler circulating	50	90
9	Refrigerator condenser circulating	95	95
10	Brine circulating, L. P.	95	95
11	Brine circulating, H. P.	95	95
12	Submersible bilge	2	2
13	General service and clean bilge	15	15
14	Boiler and engine room bilge	10	15
15	Boiler room bilge	10	10
16	Dirty ballast and engine room bilge	10	10
17	Bilge and ballast	10	5
Fresh Water Pumps:			
18	Main feed	51	98
19	Auxiliary feed	2	2
20	Port feed	53	98
21	Washing water	98	98
22	Drinking water	98	98
23	Hot fresh water	98	98
24	Ice water circulating	98	98
25	Evaporator feed	10	5
Fuel Oil Pumps:			
26	Fuel oil service	98	98
27	F. O. transfer and oily ballast	2	2
Lubricating Oil Pumps:			
28	Lubricating oil service	50	90
29	Lubricating oil standby	1	1
30	Dirty lubricating oil transfer	5	5
Miscellaneous:			
31	Main cargo oil pump	7	6
32	Cargo strapping pump	40	40
33	Sewage ejector pump	40	40

A characteristic list of pumps for a modern vessel showing the percentage of operating time for each pump on two classes of service.

requires considerably more floor space than a vertical pump. The vertical pump, however, has the advantage of requiring a smaller foundation. The cost of the foundation of a horizontal pump in most cases will be approximately 100 per cent. greater than for the vertical pump. This difference will often offset the price differential between the two types.

Considerations Underlying the Selection of a Pump for a Given Service

It is a fact not always well understood that the problem of adapting a pump to a given service involves more than the simple knowledge of the head and capacity conditions, and that, if a centrifugal pump is to be used, a more careful study of the operating conditions is necessary than if a displacement type of pump is required. In a displacement pump, capacity and speed are dependable variables, and pressure is an independent variable. Therefore, a wide variation of capacity conditions is possible without changing the characteristics of the pump. Up to the limit of the strength of the materials used and the energy of the steam available, the pressure can be varied likewise.

In a centrifugal pump, pressure, capacity, and speed are all interrelated, so that a change in one involves definite characteristic changes in the other two. The selection of a centrifugal pump, therefore, requires not only a study of the pressure-capacity relationship for the normal or expected conditions of operation but also a study of these factors throughout the entire range of possible operating conditions. Some of the underlying principles of both types of pump and their adaptability to marine service will be discussed in future installments.

(To be Continued)

*Manager, Marine Sales, Worthington Pump and Machinery Corp.

**Paper read at Annual Meeting of the Society of Naval Architects and Marine Engineers, November 19 and 20, 1931.

Some New Materials in Shipbuilding

By William E. Blewett, Jr.*

Assistant to the President, Newport News Shipbuilding and Dry Dock Company

THE subject of "New Structural and Decorative Materials as Applied to Shipbuilding" is a rather difficult one to discuss in that, depending upon the interpretation of the word "new," many or few materials may come under consideration. Shipbuilders and ship operators have been very prone to demand old, tried materials rather than to experiment with the many new and uncertain ones which have been developed in recent years.

Eliminating the processes used in manufacturing and minor variations in ingredients, there remain very few materials used aboard ship which could unrestrictedly come under the category of new materials. We will, therefore, confine this paper to materials which are uncommon in their usage aboard ships and to some of the untried materials which seem to have desirable properties.

High Elastic Steels

Most important and beyond a doubt the most considered materials applying to the construction of large ships are the high elastic steels which have recently been developed. Steel with high physical properties makes possible the economical construction of large ships by permitting a reduction in weight without sacrificing strength, and as the strength members of the modern North Atlantic ships are so constructed it seemed in order to investigate the properties of some of the high elastic steels which are available.

- A. Navy High Tensile Steel.
- B. Mild Copper-Bearing Steel.
- C. Low Carbon Manganese-Vanadium Steel.
- D. Structural Silicon Steel.
- E. Structural Silicon Copper-Bearing Steel.
- F. Martiniel Steel.
- G. High Tensile Nickel Ship Steel.
- H. Mild Structural Steel.

The mild steel plate and mild copper-bearing steel, while not classed as high elastic materials, were included for comparison.

The chemical analyses of the specimens were made by the respective mills and are as follows:

All tensile tests were made in duplicate and in both directions of rolling. The 18 inch standard plate tensiles, test section 1½ inches wide by the plate thickness with 8-inch gauge marks, were tested by the Timm Olsen Testing Machine Company, who furnished graphs covering the physical data.

The bend test specimens, 1½ inches wide by the

Specimens	Direction	Material	1/2 Rper	Y P p.s.i.	T S p.s.i.	Thick- ness in.	Elong. in.	R.A. %	Cold bend	Brinell hardness
1-2 A	Trans	Navy High Tensile	8"	60,000	83,000	3/4"	22.2	66.0	180°	49
2-3 A	Long		8"	60,791	83,301	3/4"	22.6	63.0	180°	49
3-4 A	Trans		8"	61,000	83,800	3/4"	21.8	63.0	180°	49
4-5 A	Long		8"	60,900	83,700	3/4"	20.5	56.0	180°	49
1-2 B	Long	Copper-Bearing	8"	292,500	499,000	3/4"	34.5	68.0	180°	80
2-3 B	Trans		8"	310,000	517,500	3/4"	32.0	68.0	180°	80
3-4 B	Long		8"	309,000	517,000	3/4"	32.0	68.0	180°	80
4-5 B	Trans		8"	290,750	506,400	3/4"	41.0	65.1	180°	80
1-2 C	Trans	Low Car	8"	74,300	94,500	3/4"	14.2	51.0	180°	50
2-3 C	Long	Low Mang	8"	75,800	96,000	3/4"	21.8	59.0	180°	50
3-4 C	Trans	Van	8"	78,100	98,000	3/4"	25.0	57.5	180°	50
4-5 C	Long		8"	77,800	97,800	3/4"	24.0	50.2	180°	50
1-2 D	Trans	No. 1	8"	110,000	140,500	3/4"	14.7	60.0	180°	48
2-3 D	Long		8"	109,000	140,750	3/4"	21.7	62.0	180°	49
3-4 D	Trans		8"	112,500	141,000	3/4"	24.5	59.2	180°	48
4-5 D	Long		8"	110,000	140,000	3/4"	24.0	60.2	180°	49
1-2 E	Trans	No. 2	8"	172,500	238,000	3/4"	22.5	44.5	180°	43
2-3 E	Long		8"	168,000	236,500	3/4"	25.0	52.0	180°	43
3-4 E	Trans		8"	170,000	238,000	3/4"	29.5	50.0	180°	43
4-5 E	Long		8"	168,000	236,000	3/4"	30.7	47.1	180°	43
1-2 F	Long	Martiniel	8"	812,500	1,065,000	3/4"	29.2	63.0	180°	80
2-3 F	Trans		8"	800,000	1,060,000	3/4"	21.0	60.0	180°	80
3-4 F	Long		8"	817,500	1,070,000	3/4"	24.0	66.2	180°	80
4-5 F	Trans		8"	810,000	1,065,000	3/4"	23.5	56.0	180°	80
1-2 G	Long	N. A.	8"	150,000	200,000	3/4"	20.5	53.5	180°	130
2-3 G	Trans	Mild	8"	140,000	190,000	3/4"	21.0	50.0	180°	130
3-4 G	Long	Structural	8"	140,000	190,000	3/4"	27.0	50.0	180°	130
4-5 G	Trans		8"	140,000	190,000	3/4"	26.0	50.0	180°	130
1-2 H	Long	Mild	8"	70,000	90,000	3/4"	28.7	66.0	180°	100
2-3 H	Trans		8"	70,000	90,000	3/4"	30.1	56.0	180°	100
3-4 H	Long		8"	70,000	90,000	3/4"	30.1	54.0	180°	100
4-5 H	Trans		8"	70,000	90,000	3/4"	27.0	61.0	180°	100

Average physical properties of high elastic steels.

thickness of the plate, were bent cold around a pin of diameter equal to the thickness of the plate. Photomicrographs of longitudinal cross-sections from each of the steel plates show all the structures pearlitic.

In order to determine the workability of the steels in respect to punching, a hydraulic press was fitted with a 1 inch punch and the pressures required in punching were noted. As the plates were of different thicknesses, the press loads were converted into pounds per square inch of area sheared, and although, because of the equipment, they cannot be construed as ultimate shearing strengths, they do form a basis for comparison.

Specimen	Lbs. per sq. in. Area sheared
A.....	60,300
B.....	40,000
C.....	68,500
D.....	57,000
E.....	58,500
F.....	54,000
G.....	55,000
H.....	47,500

In addition to punching, the plates were joggled, sheared, and flanged. Although no loads were measured, it was apparent that specimens could be worked satisfactorily.

The effect of welding on the various plates was investigated by subjecting welded specimens to tension and bend tests. All plates were both butt and fillet welded without difficulty, using a low carbon fluxed rod. Tension and bend tests were made from speci-

Specimen No.	C	Mn	Si	P	S	Cu	V	Ni
A	0.31	0.96	0.28	0.031	0.027			
B	0.12	0.37	0.01	0.016	0.032	0.26	0.16	
C	0.14	1.42	0.30	0.019	0.017			
D	0.36	0.95	0.30	0.022	0.034			
E	0.33	0.30	0.30	0.026	0.029	0.21		
F	0.22	0.66	0.14	0.042	0.043			
G	0.21	0.62	0.24	0.042	0.022			2.71
H	0.19	0.83	0.11	0.027	0.031			

Chemical analyses of high elastic steels.

*Paper read before the Society of Naval Architects and Marine Engineers at New York, November 20th, 1931

Specimen	A	B	C	D	E	F	G	H
Ultimate strength p. s. i.	83,000	49,000	99,950	88,750	78,500	68,650	83,500	62,100
Ultimate strength % increase over "H"	31.0	-21.1	61.0	43.0	28.3	10.5	31.5	0.0
Yield point p. s. i.	45,750	29,250	72,000	13,350	18,150	40,150	51,000	37,850
Yield point % increase over "H"	20.8	29.4	91.0	19.8	37.2	6.8	42.6	0.0
Yield point % of ultimate p. s. i. ultimate over yield point	51.9	59.6	72.3	51.0	60.1	58.9	64.6	60.8
	37,550	19,750	27,050	43,400	31,500	28,200	29,950	22,400

Comparative tensile values of high elastic steels.

mens 1 inch by the plate thickness welded into a 45-degree single V butt, the excess weld metal being machined off flush with the plate.

Analyzing the above results, we find that the strength of the weld metal remains fairly constant with an average of about 67,000 p.s.i. This is what might be expected with the specimens machined to break at the welded section. It does, however, show that a good bond was made between the deposited metal and the plates.

The bend tests of the welded specimens range from 56.5 degrees in "C" to 111.5 degrees in "B," with an average of 80.8 degrees for the lot.

In order to determine the effect of the heat of the weld on the various plates, each specimen was fillet welded and the weld machined off flush with the plate, leaving only the base metal. The tension specimens were 1 inch by thickness of plate and the bend specimens were 2 inches and 8 inches by plate thickness. Examination of etched cross-sections did not show any marked effect in the base metal from the penetration of heat from the weld except in the case of Specimen "C" (low carbon manganese vanadium), which showed a concentric band below the weld.

Examination of the weld cross-sections at 40 X and 100 X did not reveal any unusual conditions. The low carbon steels are preferable from the angle of grain development below the line of fusion. In the case of the higher carbon steels "E," "D," and "A" there is a sharp transition along this line: the base metal immediately below and adjacent to the line develops a coarse, overheated structure that should affect the ductility of the weld adversely.

This examination of some of the so-called high elastic steels indicates that they have characteristics which could advantageously be applied to ship construction, although, before definite conclusions are drawn, further investigations should be made to include hot working, corrosion, fatigue, and proportional limit tests. The low carbon manganese vanadium steel with its high yield and ultimate appears most desirable from a weight viewpoint. However, this steel will be difficult to fabricate, its cost is high, and it seems to be

somewhat detrimentally affected by welding. Navy high tensile seems to be a desirable steel, although it also is difficult to fabricate; however, it shows no ill effects from welding and has a high yield point with a good elongation. Nickel steel has a slightly higher yield point and may be compared with the Navy steel excepting that there is apparently an embrittlement in the vicinity of the weld which, together with its high cost, would tend to prevent its general use.

Martinel steel appears satisfactory in almost every respect, although its yield point is the lowest of all the high tensile steels. Its properties, due to a heat treated process at the mill, are likely to be destroyed when subjected to hot working.

The .30 silicon steel seems to fulfill most requirements for a ship steel. It is easily worked, has a high yield point, is not affected by welding, has a normal structure, and its cost does not make it prohibitive. The specimen used contained some copper so that further experiments to determine its corrosive and galvanic properties should be conducted, but from this preliminary investigation it seems as though a high silicon steel is as adaptable to ship work as it is to structural work.

Rivets

In recent years much attention has been paid to corrosion caused by galvanic action in ships. Many complicated troubles occur in condensers, pipe connections, and bilge conditions in the engine room, but particularly important, aside from the engine room, is the action between rivets and plates in the shell. Some ship operators favor alloyed rivets, others wrought iron, while still others maintain that steel rivets give the best service. The iron and alloyed rivets are usually cathodic to the shell plating in the presence of an electrolyte, which fact probably accounts for their durability. But there are instances where steel rivets have proved superior to both iron and alloyed rivets. It is reasonable to assume that, due to the present extensive use of copper bearing steel by the railroads, many of our shell plates will contain some copper, and as a copper content causes the shell to be electronegative to steel or iron rivets, corrosion of the rivets will be hastened.

It is a well-established fact that, to prevent electrolytic action in salt water, contact between copper steel and structural steel should be avoided. It follows that, wherever corrosion can be attributed to galvanic action, the iron and alloyed rivets will probably give better service, but there are other features to be considered which are sometimes more serious.

Recently the steamship W. M. Irish (oil tanker) was dry docked, after having been in continual service for

Specimen	Tensile strength of weld p. s. i.	Degrees bend of weld	Tensile strength plate p. s. i.	Weld % of plate strength
A.....	69400	75.5	83300	83.0
B.....	59850	111.5	49000	122.0
C.....	67250	56.5	99950	67.0
D.....	71050	63.5	87750	80.7
E.....	68650	65.5	79650	86.1
F.....	65750	100.0	68650	95.7
G.....	65850	74.0	83500	79.8
H.....	69250	100.0	62100	114.0

Comparative tensile and bending tests of plate and weld, high elastic steels.

Specimen	Tensile strength of plate with weld removed	Tensile strength of original plate
A.....	83300 p. s. i.	83300 p. s. i.
B.....	48850 p. s. i.	49000 p. s. i.
C.....	98000 p. s. i.	99950 p. s. i.
D.....	89100 p. s. i.	88750 p. s. i.
E.....	77850 p. s. i.	79650 p. s. i.
F.....	69650 p. s. i.	68650 p. s. i.
G.....	83200 p. s. i.	83500 p. s. i.
H.....	63100 p. s. i.	62100 p. s. i.

Tensile tests to show effect of welding on high elastic steels.

Type	Thickness	Welds made by Electric		Welds made by Gas	
		Exposure	Remarks	Exposure	Remarks
A	1/8"	90	Plate marked	90	Plate marked
B	1/8"	90	O. N.	90	O. N.
C	1/8"	90	Plate marked	90	O. N.
D	1/8"	90	O. N.	90	Plate marked
E	1/8"	90	O. N.	90	O. N.
F	1/8"	90	Plate marked	90	Plate marked
G	1/8"	90	O. N.	90	O. N.
H	1/8"	90	O. N.	90	O. N.

Results of bend tests on fillet welds, high elastic steels.

254 days, and it was found that the shell plates and rivets, which had been renewed at her last docking, were badly corroded. The corrosion was not confined to any particular section of the ship. It was in way of dry cargo spaces, as well as oil tanks and machinery spaces. For trial purposes, this ship's bottom had been driven with iron rivets, steel rivets, and alloyed rivets. Of the three materials, the steel rivets seemed to be withstanding corrosion the best. Test specimens were taken from badly corroded alloyed and iron rivets and

all analyzed as good commercial materials.

The service in which this ship operates is very hard. She has narrow shallow channels to negotiate in Texas, where her underwater surface is well secured of all paints, and her home berth is in the Schuylkill River, where she is in water containing sewage and acid residues from manufacturing plants. From the analysis of the plates and rivets, it appears that galvanic action was not the probable cause of the excessive corrosion, and from the location and distribution of the corrosion, stray current electrolysis may be eliminated. However, there remains the acid condition of the Schuylkill, which coupled with the scraping of the bottom in Texas channels may be considered as responsible for the condition of the rivets and plates.

Therefore, in selecting rivet material for any particular ship, generalization should be avoided, and particular attention paid to the materials of construction and to the service in which the ship operates.

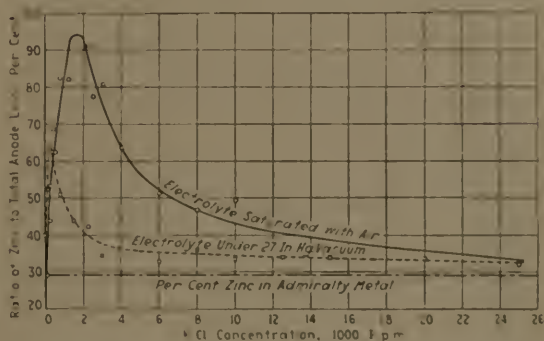
(To be continued)

Corrosion Tests on Condenser Tubes

*Abstract of Progress Report of Special Research Committee
of the American Society of Mechanical Engineers*

THE Research Committee of The American Society of Mechanical Engineers is composed of a number of the keenest engineers and executives of American manufacturers of condensers and condenser tubing, together with some of the leaders of the steam-power generating industry afloat and ashore. The present report, No. 4 of a series, deals principally with the effect of entrained and dissolved air in the circulating water. Laboratory experiments were carried out to determine the relative effects of corrosive solutions under vacuum and charged with air.

Cells were made using admiralty brass anodes and copper cathodes with a solution of potassium chloride for an electrolyte. With these cells, a series of tests were made with varying concentrations of the electrolyte under vacuum and charged with air. The loss in weight of the anode was carefully measured and the results plotted in the curve shown herewith. Analysis of the percentage of zinc loss as compared with the total anode loss was plotted in a second curve, also shown. It is evident that the presence of air has a very decided tendency to increase the rate of corrosion

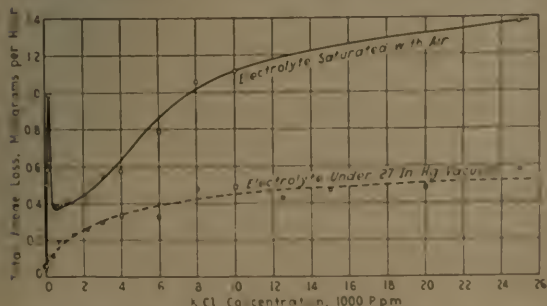


Curves showing the relative dezincifying effect of corrosion solution when under vacuum and when saturated with air.

losses. This effect is not constant for all conditions of circulating water, but is of "sufficient magnitude at all concentrations to make the presence of air very undesirable."

The dezincification curve is interesting as showing the tendency of admiralty brass to lose zinc, particularly in the presence of low concentrations of chlorine. A number of failures of condenser tubes have been investigated by the committee, and dezincification has been found to be worse at the top surface of the tube and in the top tubes of the condenser where one would naturally conclude that there was more exposure to entrained air.

It would seem worth while, therefore, to eliminate entrained air from circulating water where practically possible. The committee cited a number of failures of 60-40 brass tubes which, even with fresh circulating water and under the most favorable circumstances, is extremely subject to dezincification.



Curves showing the relative effects of corrosive solution when under vacuum and when saturated with air.

Marine Refrigeration Simplified

*A Series of Articles on the Handling of Perishable Products on
Shipboard from the Ship Operator's Standpoint*

Part XIII—Installation of Refrigeration Plant Aboard Ship

By L. L. Westling

(Copyright 1931 by James S. Hines)

IN Installment XII of this series of articles, there was presented an outline specification covering construction of cold storage spaces aboard ship after approved modern methods. Here this specification is continued to cover the refrigeration plant.

16. Coils

(a) There shall be sufficient coilage to allow the use of the chambers for any temperature from 8 deg. F. to atmospheric temperature.

(b) The brine coils shall be of 1½ standard weight galvanized iron pipe, with expanded flange connections, and regalvanized after bending and assembly. The coils shall be on walls only and shall clear the insulation by 2 inches. The coils shall be installed in two complete circuits, the upper circuit to have one-third the cooling surface and the lower circuit to have two-thirds. All control valves shall be outside of the chambers; coils to be tested to 150 pounds per square inch pressure and to have gate stop valves at the ends of each room circuit.

(c) The direct-expansion coils shall be of 1-inch extra heavy black pipe with welded or ammonia flange union connections; threaded joints to be used only on approval. The separate coils shall be tested in the shop at 400 pounds per square inch pressure and to 200 pounds air pressure in the ship after installation and before the baffles are installed. The coils shall be on the walls only and they shall clear the insulation by 2 inches. The coils shall be installed in two complete circuits, the upper circuit having one-third the cooling surface and the lower circuit having two-thirds. All control valves shall be outside of the chambers. The inlet end of each coil shall be to the bottom pass. Coils shall have stop valves at the end of each circuit in addition to the expansion valve.

(d) The coils shall be installed in the brine coil room and shall be constructed of 2-inch pipe with expanded flange connections to inlet and outlet headers. The coils shall be staggered and shall be so spaced as to allow for heavy frost accumulation. Hot brine connections shall be provided for defrosting. The coils shall stand over an 8-pound lead pan to facilitate ready draining when defrosted.

(e) All coils shall be suspended in galvanized iron hangers with support under each pass and secured to prevent vibration.

17. Ventilation

(a) Each room shall have water-tight, motor-driven, pressure-type blower fans with suction to within 18 inches of the deck. The discharge duct, of —gauge

galvanized iron, shall be installed against the center of the ceiling for the full length of the room. Holes ¼ inch in diameter shall be punched along the upper edges on 4-inch centers. The air streams shall thus be directed along the ceiling toward the wall coils. The blowers shall have a capacity of — cubic feet per minute with a static pressure of ¼ inch of water. The discharge duct shall have a 2-inch branch of galvanized iron pipe run through the insulation to the outside air, this pipe to be fitted with a cap and chain. Water-tight switch, tell-tale light, and controller for the motor shall be installed outside the space.

(b) Ducts leading from the coil bunker room shall be carried to a chamber, formed by the insulation and a false bulkhead of wood, along the opposite sides of the space so connected that one side is on the fan suction and the other on the discharge side of the fan. Two rows of sliding ports, approximately 4 x 10 inches shall be located so that the air can be directed from the low supply side and exhausted from the high suction side. The ducts at the coil bunker room shall be so designed that reversal of air flow may be effected at will.

18. Thermometers

Each room shall have one mercury-actuated recording thermometer, the bulb to be installed at the center deck head and the instrument installed outside the space. A metal cover shall protect the instrument from damage, and a perforated guard shall be installed over the bulb. The bulb shall be suspended in hangers to clear the insulation by one inch.

19. Machinery—General

There shall be two complete groups of machinery equipment, each group of sufficient capacity to maintain 20 degrees F. temperature in all ship's and cargo chambers with sea temperature of 80 degrees Fahrenheit. One receiver may be used with sufficient volume to hold a complete charge for system, plus 25 per cent. reserve.

Compressors, condensers, evaporators (if brine used), pipe, etc., shall be so connected that any grouping of units may be used while any reserve unit may be isolated. Contractor shall submit detailed arrangement drawings of each unit, pump excepted, and give capacities in American Society of Refrigeration Engineers' ratings, speeds, etc. Successful contractor shall submit pipe system drawings for the approval of the owner.

20. Compressors

(a) Compressors shall be single or double acting units, with... (number) cylinders each, and shall be

driven by a steam reciprocating engine mounted on a deep bed plate.

(b) Compressors shall be single or double acting units, with . . . (number) cylinders each and driven by an electric motor. The motor shall be of splash-proof construction with heavy fly wheel between the motor and the compressor block, the unit to have a deep bed plate. The motors shall operate at . . . volts, direct current, with a 50-degree Centigrade ambient, and all electric equipment shall conform to the marine rules of the American Institute of Electrical Engineers. Motors shall have variable speeds from 60 to 100 per cent. of designed speed.

(c) Carbon dioxide cylinders shall be of forged steel and tested to 2500 pounds per square inch pressure.

(d) The compressor units shall be installed on a heavy structural steel foundation of sole plate with flanged edges and with drains to bilges, the compressor to be secured with holding down bolts through chocks and two bolts to be body-bound. Perfect alignment must be verified.

(e) The compressors shall be seated on a foundation of . . . wood, planed parallel to the ship's base line. The wood seating shall be bound on four edges by a continuous 5-inch channel bar waterway of welded construction and welded to the deck at both heels, and fitted with drains to the bilges, the wood filling to be not less than 2 inches thick nor of pieces less than 10 inches wide and secured to the deck with grommetted galvanized deck bolts, sunken heads, and plugged. Seams shall be caulked and payed with marine glue.

21. Condensers

(a) Ammonia condensers shall be of the double pipe type in two banks, . . . feet long, each bank to have full capacity for one compressor with circulating water at 80 degrees Fahrenheit.

Condensers shall be tested to 200 pounds pressure on the ammonia side, coils to be of black, single X, iron pipe with welded connections.

(b) The two carbon dioxide condensers shall be of the cylindrical shell and tube of coil type, each with capacity of one compressor, and shall have no joints inside of the shell or lagging. Means of ready repair or cleaning shall be provided.

Condensers shall be tested to 2500 pounds pressure on the carbon dioxide side, coils to be of copper tubing with brazed connections.

22. Receivers

Receivers shall be of welded steel construction with seams for determining the liquid level. Capacity shall be such that the complete charge of refrigerant in the system may be stored in the receiver, plus 25 per cent. reserve.

23. Charging Tank

A steam-heated water tank or trough shall be supplied, in which cylinders may be placed to prevent freezing of refrigerant while charging the plant. (Very necessary for carbon dioxide plants).

24. Evaporators

(a) Evaporators shall be constructed of continuous tubes within the shell and no joints shall be permitted within the shell or lagging. Means for ready repair or cleaning shall be provided.

(b) Ammonia evaporators shall be of the cylindrical shell, vertical or horizon type; and means shall be provided for determining height of liquid.

(c) Carbon dioxide evaporators shall be of the cylindrical or "D" type with 1½-inch extra heavy seamless

steel tubing. Means shall be provided for ready repair or cleaning.

(d) Contractor shall state the cooling surface of evaporators.

25. Brine Pumps

(a) There shall be two brine pumps, each of . . . gallons per hour capacity at a head of . . . pounds.

(b) They shall be duplex reciprocating steam pumps, with monel water end piston rods and equipped with air chambers.

(c) They shall be motor-driven rotary or centrifugal type pumps, of cast iron and bronze fitted. The motors shall be enclosed splash-proof type with a 40 degree ambient temperature.

26. Brine Tanks

Brine make-up tanks of approved design shall be supplied, to be of steel plate construction.

27. Brine Return Tank

(a) The brine return tank shall be cylindrical, of steel construction, totally enclosed, and with access manholes for cleaning. Gauge glasses shall be fitted to show the height of brine, and the tank shall be properly vented. All connections shall be insulated with 6 inches of corkboard, and covered with bituminous cement, trowelled smooth.

(b) Brine return tank shall be installed in a brine room located so as to drain to the evaporators. It shall be of welded steel and open at the top. At two-thirds height there shall be installed an angle bar frame to support a perforated bronze screen. It shall have two compartments, divided in its length, with a drain from each compartment so that either compartment may drain to either evaporator when plant is used as a two-temperature system.

28.—Refrigerant Piping

(a) Ammonia piping on the high pressure side shall be of single "X" black iron pipe and made up with flange union connections. The low pressure side shall be of standard weight black iron pipe with flange unions. All equipment to be installed shall be cross-connected to facilitate operation as a two temperature or as a combined one-temperature system.

(b) Carbon dioxide piping shall be of seamless steel tubing, and all joints shall be welded. All fittings shall be of steel forgings and subjected to an air test pressure of 2500 pounds after assembly.

All piping shall be rigidly secured to ship's structure. Pipe hangers on low temperature lines shall be on the outside of the insulation, with steel shoes or cradles to prevent chafing.

All pipe exposed to damage by cargo shall be protected with steel plate guards.

All fittings, such as oil separators, gas driers, gauges, etc., required to make a complete plant shall be supplied and installed by the contractor.

29. Brine piping

(a) All brine piping shall be made up of standard weight iron pipe, galvanized after expanded flanges have been secured. All valves shall be flanged gate type. Pipe shall be secured after the same manner as the low temperature gas lines.

(b) For a one-temperature system the brine pumps shall take their suction from the evaporator shells and discharge through the main distributing system to the chambers. The return lines shall combine to the return tank, which shall drain to the evaporators.

For an enclosed system the brine pumps shall take their suction from the return tank and discharge to the evaporators, and thence to the distributing systems.

The return lines shall drain to the return tanks.

(c) The brine system shall be so connected that a two-temperature system may be used, the brine pumps to take their suction from either or both evaporators and discharge to either or both brine distributing systems. The return from each chamber shall be run independently back to the divided brine return tank, which may drain to either evaporator.

All brine lines shall have thermometers and valves located at distributing headers, at each return line, and in and out of each evaporator.

30. Condenser Circulating Pump

A.... driven.... condenser circulating pump shall be installed, with a capacity of.... gallons per minute and a head of.... pounds per square inch.

31. Insulation

All low temperature gas and all brine lines shall be insulated with the best cork forms of brine thickness, bound with brass wire. All insulation shall be sealed

with petrolastic cement and painted with an asphaltic paint to insure air-tightness of all coverings.

32. Tests

After all mechanical work is complete, the entire system shall be tested for leaks, after which pipe and tank insulations shall be installed.

When fully charged with oil, refrigerant, and brine, the plant shall be operated for.... hours;.... hours on each set of units, and.... hours with all equipment in use.

All chambers shall be brought down to a temperature of 10 degrees Fahrenheit, the plant shut down, and the rate of temperature rise noted in each compartment. All adjustments shall be made, and the plant shall be delivered to owners ready for operation.

33. Guarantee by Contractor

Contractor shall guarantee all equipment, materials, and workmanship for a period of.... months.

Important Progress and Trends in Marine Engineering for 1931

By D. W. Niven

Manager, Federal & Marine Dept., General Electric Co.

ELECTRICAL marine power advanced to an important position during the year 1931 and the movement become more world-wide in its scope. In addition to the large number of turbine-electric drive ships either commissioned or nearing completion in the United States, a number of important ships were either placed in service or at the fitting out docks in England, and work was started on a super-liner in France. The total horsepower installed and in process of construction, since the beginning of turbine-electric drive, passed the 1,000,000 mark during the year.

In viewing the future trend with respect to large passenger ship applications it becomes evident that turbine-electric drive will play a much larger part in the future than in the past. The diversified activities and requirements of such vessels, which include seasonal changes of speed, alteration of speed between various legs of a journey, and the employment on cruising and excursion duty, emphasize the need for a power plant having the widest degree of flexibility. Many of the foregoing services require but a fraction of the total installed horsepower capacity, and the ability of turbine-electric drive to operate all propeller shafts under such conditions, with part of the main power plants and attendant auxiliaries shut down, is a feature not obtainable with other forms of drive.

The diesel-electric form of drive, because of its large field of application to harbor and inland waterway craft, was influenced by general business conditions. Except for the completion of tonnage or projects carried over from the year previous, there was little of what may be termed new business. Recent surveys made as to the age, inadequacy, and obsolete tonnage now in existence in these services show that a progressive and modernizing renewal program cannot be evaded much longer.

The turbine-gear field has benefitted during the year by the general improvement in turbine design and economy, and this in turn will have a great bearing on the cargo boat of the future, or other types of ships to

which this form of speed reduction is applicable.

Auxiliary electrification has become further entrenched as a standard measure on practically all types of ships during the year, irrespective of the type of main propelling equipment installed. There has also been a continuous advancement in the uses to which it may be applied. One of the most favorable tendencies is shown by the type of equipment demanded. Open motors and those protected by flimsy or makeshift methods are almost entirely disappearing from the marine field. Their place is being taken by motors built especially for marine service which are adapted to long years of hard usage with negligible cost of upkeep. Automatic and magnetic types of control equipment are also almost completely taking the place of the old types of hand operated rheostatic starters, thereby affording greater protection to and prolonging the life of the equipments.

The operating and service records of the turbine-electric drive ships which have been commissioned during the past few years have been of an enviable nature and marked by an almost complete absence of upkeep charges. The car ferry City of Flint, operating on the Great Lakes, which is forced to break ice during the winter months, reports 364 days of continuous duty during the year with one day lay up only for annual government inspection. The mileage covered exceeded 101,000, which may be very close to a world's record. The yacht Corsair also reports having covered 25,000 miles during one year's service. The clocklike regularity and maintenance of schedules by the large fleet of turbine-electric propelled passenger ships, and the maintenance of the same high efficiency as when new has been gratifying to the owners and operators and also confirms the early opinions of the design engineers with respect to the complete reliability of this form of drive. The passengers also continue to be particularly satisfied with the electric drive ships, and this in turn has tended to greatly popularize the various trade routes to which the ships have been assigned.



Marine Equipment

EXHAUST TURBINES ~ ALL WELDED HULL
AUTOMATIC ELECTRIC PLANTS ~ HIGH SPEED GEARS

Triple Expansion Steam Engine with Exhaust Turbine Shows Good Economy in New Tanker Installation

THE oil tanker Pan Bolivar, recently delivered to the Pan American Petroleum & Transportation Company, showed remarkably good economy and speed on her first three trips, making 11.3 knots in ballast on 168 barrels of oil per day, and 11.2 knots loaded on 180 barrels per day, with two boilers. Using three boilers, a speed of over 13 knots has been maintained easily.

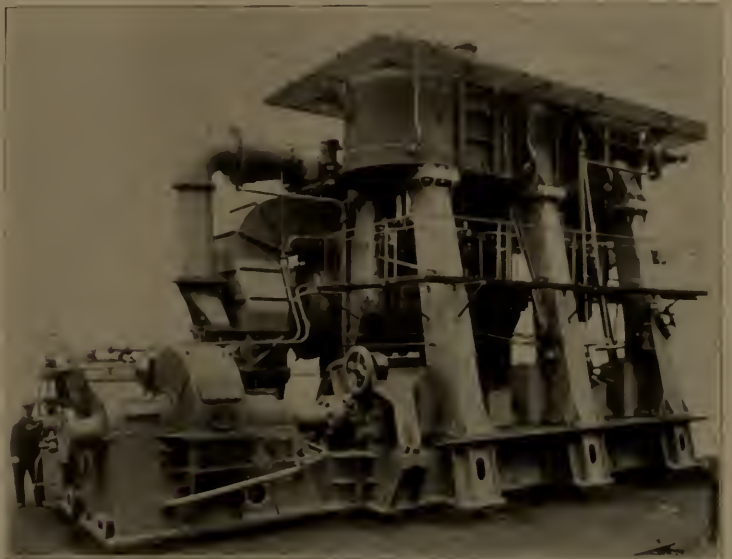
This vessel, built to Lloyd's highest class, by Swan, Hunter & Wigam Richardson, has the following principal dimensions:

Length 483' 0"
Breadth (molded) 65' 3"
Depth (molded) 36' 9"
Capacity
14,000 tons on 27 ft. 3 in. draft

Under the new United States Freeboard Law, 15,110 tons would be permitted at 28 feet 8 $\frac{1}{4}$ inches draft.

The power plant consists of a triple expansion engine, 27 $\frac{1}{2}$ inches, 45 $\frac{1}{2}$ inches, and 76 inches bore, and 51 inches stroke, exhausting into a Bauer-Wach turbine. She is the first new tanker to be equipped with this combination. Three boilers of the single-ended, multi-tubular type, with the Wallsend-Howden patent pressure system generate steam at 220 pounds gauge and superheated to 50 degrees Fahrenheit. Auxiliaries are steam-operated and exhaust to a single-feed water heater. The combined machinery was designed to develop the equivalent of 3600 indicated horsepower on full power sea trial, which would give a speed of 11 $\frac{1}{2}$ knots at 73 revolutions per minute, with the vessel fully loaded.

This vessel ran her trials very



The triple expansion engine Bauer-Wach exhaust turbine power plant of the Pan-American oil tanker Pan Bolivar.

successfully on July 8, 1931, sailing for New York the following day, and entered upon her regular duty of carrying oil from Aruba, Dutch West Indies, to New York, on July 29.

Her average performance on the first three voyages from New York to Aruba, in ballast, and return fully loaded, between July 29 and September 13, as taken from her log sheets, was as follows:

	Ballast	Loaded
Distance (nautical miles)	1735	1735
Speed (knots)	12.35	12.12
Fuel consumed (bbl. per day)		
.....	185	210
Average r.p.m.	72.5	73.5
Knots per bbl.	1.6	1.38

On the second loaded voyage from Aruba to New York, occupying from August 23 to August 28, 3850 indicated horsepower was developed, which gives an Admiralty coefficient of 376 and a fuel coefficient of 43,100. These figures, which include steam for heating cargo and all other purposes, were obtained with oil having a calorific value of 18,175 B.T.U. per pound. The vessel has plenty of reserve power and can be operated either with the reciprocating engine or with the turbine alone, having in that respect the advantages of a twin-screw vessel.

American Bauer-Wach Corporation is American distributor for the Bauer-Wach exhaust turbine.

Arc Welded Auxiliary Yacht

By R. A. Gast

Mechanical Engineer, The Lincoln Electric Company

THE economy practiced in the Wilhelmshaven shipyards by the German navy in the construction of seamless, rivetless ships has been successfully applied in this country by Hans Mauerhoff, designer and engineer for Cox and Stevens of Detroit. The saving so effected is about 25 per cent. in cost, 22 per cent. in construction time, and 20 per cent. in weight and materials.

The hull, fused into a single unit with the electric arc, is, in effect, a huge stamping of pressed steel, seamless and rigid. There are no rivets to corrode, no seams to caulk. The exterior of the hull is a smooth surface, the plating being butted and not lapped together.

The design called for a 53-foot auxiliary cruiser, 48 feet at the water line and 14 feet at the beam. The skin of the hull consists of $\frac{1}{4}$ -inch plate at the keel, $\frac{3}{16}$ -inch plate on the sides, topped by $\frac{1}{4}$ -inch plate just below the deck line. These plates were fused together with a heavy butt weld and the arc deposited metal is ground flush with the plate. The longitudinal frames are flat steel stock, 24 by 2 by 3 16 inches, tack welded to the plates. For the web frame 3-inch, 5.7-pound, structural I-beams were used. These were fused into place with 4-inch tack welds spaced four



Hull of the arc-welded, rivetless yacht now building in Detroit.

inches apart. The forecastle bulkhead and the center board box were constructed in the same manner.

On this boat the teak deck planking is fastened to the structural supports with brass screws from beneath; $2\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{3}{16}$ -inch angles are used to carry the deck, except around the hatches and masts, where 3 by 3-inch, 6.1-pound, T-shapes were used.

The economy of this type of construction is basic. A welded joint is seamless and shows better physical characteristics than mild rolled steel. Modern arc welding procedure makes possible connections with a tensile strength 20,000 pounds greater than rolled steel, higher ductility and greater resistance to

corrosion. Connections made with the shielded arc process are 140 per cent. efficient.

Drafting room and shop time is cut with the use of arc welding, and there is a considerable saving in material. With the arc, members may be joined at right angles without the addition of a third member, the cost of the rivets themselves and of the "waste plate" are saved. This arc welded, single unit construction produces a vessel of considerably greater strength, pound for pound, than any other method.

Welding equipment used on this boat consisted of $\frac{5}{32}$ -inch welding electrodes and a "Stable Arc" welder, manufactured by the writer's company. The same designer hopes to gain even greater economy on his next boat with the use of the improved shielded arc process which allows a 200 to 400 per cent. increase in welding speeds.

Trade Note

Monarch of Bermuda.—Equipment supplied by the Sperry Gyroscope Co., Ltd., to this new deluxe vessel consists of the latest type Merchant Marine Gyro-Compass with full complement of repeaters and course recorder and in addition two Sperry 24-inch incandescent searchlights. These searchlights are especially designed for use in traversing the Suez Canal. Equipped with split mirrors, the beams may be spread at will, to provide a 5-degree dark sector as required by the canal regulations. This arrangement prevents blinding the pilot of an approaching vessel and at the same time gives safe illumination of both banks of the canal.



Interior of arc welded hull showing method of construction in way of the bulkheads and the center board.



Artist's conception of the new United States liner Manhattan, as she will appear when finished.

Plyboard Paneling in Modern Liners

Haskelite Aids Greatly in Producing Beautiful Effects for Interior Decoration of Public Spaces Aboard Ship

THE passenger liner Manhattan, launched on Dec. 5, at the Camden Yard of the New York Shipbuilding Company, is the largest and most costly merchant vessel ever launched from an American shipyard. In preparing these specifications for the material and equipment used in her passenger accommodations, the orders to the naval architects were "Use the best available." It is therefore a matter

of justifiable pride to The Haskelite Manufacturing Corporation that Haskelite plywood has been chosen for the bulkheads in the living quarters throughout this great ship and her sister ship, building at the same yard and as yet unnamed. On these two vessels there will be used approximately one-half million square feet of Haskelite plywood paneling.

In the case of the first-class

staterooms, plain Haskelite has been furnished, on which the interior decorating firm will apply various fancy hardwood faces to suit the decorative treatment of the various rooms. On all other living quarter bulkheads, the Haskelite Manufacturing Corporation is furnishing the plywood panels complete with birch faces. Much of the joiner work for the public spaces will be Haskelite with hard-



Artist's conception of the beautiful interior of the first class smoking room on the Steamship Manhattan. Haskelite paneling in hardwood and paint finishes is used to produce these beautiful effects.

wood faces. All staircase panels will be Haskelite; and all the public rooms in the tourist class will be finished in Haskelite paneling with faces to suit the requirements of the interior decorator. Even the plywood used in the specially built furniture is being furnished to the Sloane Company by the Haskelite Corporation.

All of this paneling has been built under very rigid plywood specifications. The filler for all panels is poplar throughout and all panels are made with special blood albumen glue which is the most water-resistant adhesive known to the industry. On all panels, unless otherwise specified, a first-class

quality of birch veneer is used for the face of the panel. On a very considerable quantity of the panels ordered, for the two United States Lines' liners Manhattan and her sister, the faces are specified to be mahogany, walnut, maple, and a number of other rare hardwoods.

The Haskelite Manufacturing Corporation is prepared to furnish plywood paneling with any face desired in any known wood, or in a variety of metal faces under their patented process of producing Plymetl. Both Haskelite and Plymetl are well and favorably known to the marine trade on the Pacific Coast through a number of installations in well known ships, includ-

ing the Key System ferryboats, the steamship City of Honolulu, the steamship Hualalai, the Waialeale, and the U. S. transport U. S. Grant. Of particular interest in this connection is the large use of Haskelite plywood paneling on the Key System ferries Peralta and Yerba Buena. Hundreds of thousands of Key commuters have had reason to bless Haskelite for the wonderful comfort of the molded Haskelite seats on these two ferries de luxe.

H. J. Hansen, special representative for the Haskelite Manufacturing Corporation, is now on the Pacific Coast in connection with sales and service for Haskelite Plywood and Plymetl.

A Lightweight Diesel of Advanced Design

A Noutstanding engine at the National Motor Boat Show will be the new-type, high-speed, 100-horsepower Winton diesel, which exemplifies the advances effected by Winton in designing and building a suitable high-class diesel for smaller pleasure craft. This engine will be shown both at the Winton exhibit and also installed in the 50-foot "Wheeler Playmate," cruiser shown by the Wheeler shipyard. Several new boats between 40 and 75 feet in length now under construction will be powered with this new unit, known as Model 182-6.

The design is exceptionally simple and compact. A marked reduction in weight and size has been effected. Each part has been subjected to exhaustive tests and experiments. The result is a lightweight diesel of remarkably ad-

vanced design. The unit is a 6-cylinder, 4-cycle, high-speed, airless-injection marine diesel engine, with 5-inch bore, 7-inch stroke, developing 100 horsepower at 1000 revolutions per minute. The engine is completely enclosed and self-contained, with necessary water and lubricating pumps, thrust bearing of ample size, planetary type reverse gear, and fly-ball type governor. Equipment includes tachometer, a set of special tools, starting battery, thermometer, and instrument board with ammeter and necessary gauges.

While light in weight, the engine is of unusually rugged construction providing the strength necessary for long, continuous running. It is clean, instantly responsive to the operator's demands, and easy to operate. The over-all dimensions of

the engine are: Length, 7 feet, 7 inches; width, 2 feet 4 inches; height, 4 feet 3¼ inches; distance center line of crankshaft to bottom of base, 9 inches; distance center line of crankshaft to bottom of fly-wheel housing, 1 foot ½ inch.

The engine is electrically started and has force-feed lubrication throughout. The thrust bearing is extra heavy, of ample size to absorb all thrust exerted by the pro-



Above, the new high speed, light weight Winton diesel engine Model 182-6, producing 100 horsepower at 1000 revolutions per minute. At right, four pleasure cruisers which are equipped with the new 100 horsepower Winton diesel.



pellor wheel, and is integral with reverse gear housing and bottom half crankcase.

The planetary type oversize reverse gear of latest design is rigidly held in alignment by extension of

engine base. The gear is ball bearing equipped; drives on clutches only, not through locked gear teeth, and automatically centralizes on the crankshaft, giving perfect balance regardless of speed.

Improved Power Sweeper for Floors and Decks



A NEW power sweeper has been introduced for cleaning docks, piers, terminals, warehouses, sidewalks, paved yards, and other large areas that must be swept frequently. It will clean approximately 42,000 square feet per hour and will handle light snow. This sweeper is mounted on a Clark Tractor which is gas powered for 24 hours continuous operation. The 60-inch broom cleans a path 52 inches wide, sweeps right or left, and the angle of sweep can be changed by the operator in less than a minute.

Broom is always under the driv-

er's control; he can lower it or raise it at will and, by a special clutch lever, can stop broom rotation instantly. In high gear the equipment has a speed of $7\frac{1}{2}$ miles per hour and going to and from work the broom is carried 6 inches above the floor or pavement. In operation best results are obtained at a speed of 2 miles per hour. The outfit may be equipped with generator and head and tail lights for night work. When sprinkler system is required a tank may be mounted on the rear platform. The equipment is manufactured by the Clark Tractor Co.

New Automatic Electric Plants

TWO new Kohler electric plants, each of which offers twice the capacity of any of the 100 other different models in this line of portable, automatic power and light units, are announced by the Kohler Company.

The two new plants, which have been developed to meet special needs, such as emergency installation on large ships and barges, regular service on big yachts, and power and light in small communities where centralized current can be used, at construction camps and oil fields, on large country estates, at resorts and camps and for circuses and traveling shows, deliver 20 kilowatt, direct current, and 25 kilovolt ampere, alternating current respectively.

Typical of the uses of these super service electric plants are installations on the Antigua, Quirigua, and Veragua, three speedy ocean liners building for Caribbean service by the United Mail Steamship Company.

Installed for emergency service in time of stress, the plants will provide current for sending radio messages, lighting passageways, and lighting the deck for launching lifeboats, if ever the main generators fail. The Kohlers also will furnish light while the ships are in dock to save the expense of keeping the main generators going.

In construction and in operation the 20 kilowatt and 25 kilovolt ampere plants resemble 5 and 10 kilo-



watt Kohler units. The new plants are powered by 6-cylinder heavy duty industrial engines of the L-head type, with removable cylinder heads. The extra heavy crankshaft is supported by seven main bearings and full pressure oiling is used to all engine bearings.

Cooling is by means of a large size radiator and water circulation pump. The radiator fan is driven by double V-belts, either of which is of ample size to drive the fan. Two are used, however, as a safety factor.

The starting system of the new plants is 12-volt and is controlled by a special relay system in order that the unit may be started and stopped by the closing or opening of a two-wire starting circuit. The plant will start and will continue to run as long as this circuit is closed. A 12-volt starting battery is kept charged automatically by a generator mounted on the side of the engine.

New Sizes of Cameron Motorpumps

A NUMBER of new sizes have been added to the Cameron line of small general service centrifugal Motorpumps manufactured by Ingersoll - Rand Company. These pumps are now made in one-inch discharge and upward.

Pump and motor are assembled as a single unit with a common shaft, producing a compact, light weight pump which requires little floor space and can be easily installed. No foundation or base plate is needed. The discharge nozzle may be turned to any one of four positions.

There are only two bearings. These are of the ball type and require lubrication but once a year. There is but one stuffing box, which is easily accessible. The impeller is made of bronze and is hydraulically balanced. Renewable bronze wearing rings and shaft sleeve are provided.

These pumps are used against moderate heads for a great variety of services, such as in circulation systems, air conditioning equipment, and water supply systems on shipboard, in warehouses, and on docks; condensate return systems; and general transfer service handling a wide variety of liquids.

The pump may be obtained in various motor combinations for all ordinary current conditions and for use in hazardous locations.

Trade Literature

Evidence Piles Up! is the title of an interesting pamphlet just published by The B. F. Goodrich Rubber Co., Akron, Ohio. It tells of the development, uses, and resulting economies of the Goodrich Cutless Rubber Bearing for marine use.

The booklet is beautifully printed and thoroughly illustrated, showing the manufacturing methods, testing processes, details of the product, and results of actual service. In addition to their use on tugs, yachts, speedboats, ferries, fishing boats, fireboats, government cutters, and freighters, Goodrich Cutless Rubber Bearings also are used in turbines and dredges.

The booklet may be obtained by writing to the company direct or through the Editorial Department of this magazine.

Foreign Diesel Ship Fleets. A comprehensive and important contribution to the literature on the diesel engine and its application to marine purposes has recently been published by The Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, Missouri. This booklet of 46 pages, published on fine, heavy stock, is a compilation of particulars of forty - three foreign fleets owning and operating 431 diesel-powered ships. The booklet has been compiled for the informative reference of American shipowners, showing power, tonnage, and recent year of completion of the various diesel-powered vessels operated by foreign shipping lines. The booklet also contains a very interesting article by Edward B. Pollister on the subject, "America Needs Diesel Ships."

The booklet may be obtained by addressing the company direct, or through the editorial department of this magazine.

De Laval Balanced Single Suction Series Pump is described and illustrated in a recent catalog (B-3) issued by the De Laval Steam Turbine Company, Trenton, N.J.

Heads higher than those practicable for a single stage centrifugal pump can be generated by connecting two or more independent single stage pumps in series, but while such an arrangement is generally used when relatively large capacities are required, the cross-connecting piping introduces additional frictional surface and involves extra space and cost. A two-stage pump having single suction impel-

lers placed back to back, that is, with the suction openings facing towards the ends of the shaft, is described in this catalog. The new pump is hydraulically balanced, just as is a single stage, double suction pump, and has but two pairs of wearing rings, the same as the single stage pump. Because of the reduced leakage, limited surface in contact with moving water and relatively high speed and high head per stage, the efficiency of these pumps is relatively high.

Copies may be obtained from the company direct, or through the editorial department of this magazine.

Valves. A 16-page book recently issued by the Reading-Pratt & Cady Company, Bridgeport, Connecticut, gives a complete description of the new Lubrotite Gate Valve with its uses. This valve differs from the ordinary gate valve in that it has a unique duct system for introducing a lubricant-seal between the seating surfaces. This results in tight seating even though the seats of the valve become injured in service, retards corrosion, and gives easier valve operation.

Copies may be obtained either through the Editorial Department of this magazine or from the company direct.

Oliver United Filters, Inc., has just published Bulletin No. 402 covering its **Stream-Line Oil Separator**. This separator is designed for prevention of oil pollution of coastal and inland waters. This equipment is adapted to American requirements by the American manufacturers under license from the Stream-Line Filter Co., Ltd., of England, the latter company having many of these installations in British and Japanese naval vessels. The separation of oil waste from bilge water is required by law in all maritime nations. This booklet goes into considerable detail on this general subject and the application of the Stream-Line principle to filtration. Booklets may be obtained by writing to the Editorial Department of this magazine or to the San Francisco office of Oliver United Filters, Inc.

Dravo Corporation of Pittsburgh, Pennsylvania, has published a book entitled **Engineering Works** prepared by the Engineering Works Department, a subsidiary of The Dravo Contracting Company. The purpose

of the book is to show in a comprehensive way the progress made by the Engineering Department in the development of designs and the construction of all classes of floating and terminal equipment, and dock and materials handling installations.

The book is issued in technical textbook form rather than catalog form and portrays the broad experience of The Dravo Contracting Company and its record of performance which places it today in a ranking position among the crane manufacturers and the shipbuilding industry for the entire country.

Obituary

T. Sturgis Barnes, sales manager of The Moore Dry Dock Company, died on December 31 after a short illness. Mr. Barnes was one of the best known and best liked shipbuilding executives on the Pacific Coast. Born in Baltimore in 1877, he joined the transport service after serving his time in a local shop. He served through the Spanish-American War and was with the United States Cruiser Brooklyn at the battle of Santiago de Cuba. He came ashore in 1907 and shortly thereafter joined the Union Iron Works at San Francisco. In 1918 and 1919 he was with the Moore Shipbuilding Company, returning at the end of 1919 to the Bethlehem Union Plant. In 1925 Barnes returned to The Moore Dry Dock Company as sales manager.

Our sympathy to his family and his shipyard associates.

Dr. Chas. V. Allen, ship's surgeon, for seven years in the employ of the Panama Pacific Line on the steamships Mongolia and California, died last November at the home of his brother Harris Allen, in Berkeley, after an illness of several months. Dr. Allen was known to many travelers as an efficient practitioner and a retiring, kindly gentleman.

One of the best known mariners out of the port of San Francisco—Captain R. E. Judson—died at his home December 28, from heart failure brought on by a recent accident. Captain Judson was for many years with the old Pacific Mail Steamship Company and later with the Panama Mail Steamship Company. At the time of his death he was a San Francisco bar pilot. He leaves a widow and two small children.



American Shipbuilding

Edited by H. C. McKinnon

Steamship Manhattan Launched

VERY efficiently and quietly, on December 5, the hull of the Manhattan, largest merchant ship ever built in America, was launched into the Delaware River from the famous covered ways of the New York Shipbuilding Company at Camden. This huge hull, 705 feet long and about 100 feet high from keel to boat deck, was one of the most difficult launchings ever made in this country. It was, therefore timed exactly for the morning high tide, and every precaution (even to dredging the river bed) was taken to insure that there would be no interference with the progress of the hull. The result was a perfect launch from the standpoint of the shipbuilder and naval architect. Precisely at 10:25 a.m. the signal "All ready" reached the launching platform and, as the hull started slowly down the ways, Mrs. Theodore Roosevelt, Sr., broke a bottle on the prow and, in a clear voice, pronounced the words, "I christen thee Manhattan," giving to America's largest merchant ship the name of the most important borough of America's greatest city. The bottle used contained blended waters from streams, springs, or lakes in forty-eight states, emblematic of the nation-wide participation in the shipbuilding loans that are making possible the addition of this vessel and other fine ships to the American merchant marine.

After the launching, the party proceeded to the Walt Whitman Hotel at Camden, where some shipbuilders, shipowners, and government officials indulged in much pertinent oratory over the significance of the event in the life of the community and the future of the nation. After the speech-making a delightful luncheon was served.

Prominent among the speakers were: P. A. S. Franklin, president of the International Mercantile Marine Company; Kermit Roosevelt, of the Roosevelt Lines; Kenneth D. Dawson, of Portland, Oregon; Basil Harris of the Roosevelt Lines; Sen-

ator Royal S. Copeland, of New York; Postmaster-General Walter S. Brown; Chairman T. V. O'Connor, United States Shipping Board; and Clinton L. Bardo, president of the New York Shipbuilding Company.

Of course the real significance of the Manhattan launching lies in the fact that it follows so closely the consummation of the operating agreement between the International Mercantile Marine Company, the Roosevelt Lines, the Dollar Lines, and the Dawson interests, whereby the assets, liabilities, and future operation of the United States Lines are absorbed and a number of wrinkles ironed out of the intercoastal, North Atlantic, and round-the-world schedules. The financial power and operating experience included in this merger of

steamship interests practically insures a successful career for the passenger liner Manhattan.

Westinghouse Awarded Contracts.—Two contracts for electrical equipment for marine use were recently awarded to Westinghouse Electric and Manufacturing Co.; one by the United States Navy Department for the complete electrical equipment for the submarine Cachalot, the other for the turbo-electric dredge for the U.S. Engineers Office, St. Louis, building by Dravo Contracting Company.

The main power plant for the Army dredge includes: One 1050 kilowatt turbo-generator set (consisting of one special type turbine; one 5000-720 r.p.m. reduction gear; one 800-kilowatt 250-volt, 720 r.p.m. main generator; and one 250-kilowatt 230-115-volt, 720 r.p.m. auxiliary and excitation generator);



Two launching views of the liner Manhattan, December 5, at New York Shipbuilding Company. At left, the vessel taking the water; at right, sponsor Mrs. Theodore Roosevelt, wife of the late president of the United States.

one 1000-horsepower, 250-volt, 245-200 r.p.m. dredge pump motor; one switching and control equipment; one 5-kilowatt, 115-volt auxiliary turbine generator set. Auxiliaries will be electrically driven, including jet pump, hoist, circulating pump, forced draft fans, main condensate pump.

The contract for the submarine Cachalot, building at the Portsmouth Navy Yard, consists of two 800-horsepower double-armature, 335-r.p.m. submarine type propulsion motors; two sets of cooling and ventilating equipment consisting of air coolers, blowers, and pumps, and one manual submarine-type control. The contract price for this equipment is \$90,000, delivery scheduled for 1932.

Bids Asked on Ferry.—Bids were opened December 30 at the office of the Multnomah County Commissioners, Portland, Oregon, for a double-end, diesel-powered ferry-boat.

Passenger Boat for Portland.—According to a report from Portland, Oregon, the Harkins Transportation Company is planning the construction of a new diesel powered freight and passenger river vessel to replace the steamer Beaver which was recently lost through collision. The vessel is for operation between Portland and Astoria, and is to be slightly smaller than the motorship L. P. Hosford, completed last June by the Albina Engine and Machine Works of Portland. She is 160 feet long, has a single screw propelled by an 8-cylinder 500 brake horsepower diesel engine, and is equipped with a Barlow freight elevator. She has accommodations for 50 passengers in 19 staterooms, with ample accommodations for a large number of day passengers.

Bids Opened on Patrol Boat.—Bids were opened December 30 at the Seattle office of the United States Forestry Service, Department of Interior, for a patrol boat for service in Alaska. The boat is to be 55 feet long, 14 feet beam, and powered with an 80-horsepower diesel engine. H. C. Hanson, Seattle, is the designer. Lyle Blodgett, of the Forestry Service, Ketchikan, is in Seattle in connection with the plans for the vessel.

Fire Destroys Plant.—The Drap-

er Engine Works and the Commercial Boiler Works on West Landers Street, Seattle, were destroyed by fire December 1 with an estimated loss of \$175,000.

Inspection Boat Ordered.—The Howard Shipyards & Dock Company, Jeffersonville, Ind., has been awarded contract for the construction of a twin-screw, diesel-powered inspection boat for the United States Engineers' Office, Kansas City, Mo. The boat will cost \$117,743.

Cutter Contract to Defoe.—The Defoe Boat & Motor Works, Bay City, Mich., has been awarded contract for the construction of Coast Guard Cutter No. 55, scheduled for operation on the Great Lakes. The vessel will be 165 ft. length over-all, 36 ft. molded beam, 21 ft. molded depth, 13 ft. draft, and of 900 tons displacement. She will be powered by geared turbines developing 1500 shaft horsepower on single screw. The vessel is scheduled for delivery October 3 at Buffalo.

Low bid of \$408,800 was submitted by the Defoe yard for this job.

Dredge Order Let.—The General Engineering & Drydock Company, Oakland, Calif., recently started construction of a suction dredge for the American Engineering Company of San Francisco. The dredge will be 150 ft. between perpendiculars, 45 ft. beam, and 12 ft. draft. Keel was laid November 23.

Bids Low on Lighthouse Tender.—Howard Shipyards & Dock Co., Jeffersonville, Ind., was low bidder, November 24, for construction of the lighthouse tender Myrtle for the Department of Commerce, Bureau of Lighthouses, at \$89,743. The vessel is to be 93 ft. long, 23 ft. beam, and 5 ft. draft. She is scheduled for service in the inside waters of the Eighth Lighthouse District along the Gulf Coast. She will be powered by two 55-horsepower diesel engines.

Fire on Segovia.—Fire almost completely destroyed the nearly completed United Fruit Company passenger and refrigerated cargo carrier Segovia, while tied up at the outfitting dock of Newport News Shipbuilding & Drydock Company last month.

Passenger Quarters on Freighters.—The Shepherd Steamship Company of New York is installing passenger accommodations on its freighters Sage Brush, Harpoon, Wind Rush, and Sea Thrush, operating in the intercoastal trade. The steamer Harpoon will have accommodations for fourteen persons and the balance of the vessels will be able to provide for eight passengers. The new quarters will be built in the forward deckhouse, with rooms accommodating two persons each. Quarters for the crew will be provided in the amidship house aft.

Steamer Alameda Burned.—The steamship Alameda, owned by the Alaska Steamship Company of Seattle, and operated for many years between Seattle and Alaska carrying freight and passengers, was burned at her dock last month. She was insured for \$500,000. The underwriters called for bids from Pacific Coast shipyards to ascertain the amount necessary for rebuilding, but the lowest bid was \$600,000; so the vessel will not be rebuilt.

The Alameda was an iron ship, built in 1883 at Cramp's yard, Philadelphia. She has been on the Alaska run since 1908.

Craig Celebrates Golden Jubilee.—Craig Shipbuilding Company, Long Beach, California, which has turned out the finest pleasure boats built on the Pacific Coast, celebrated its Fiftieth Year in the shipbuilding business last month. Three generations of the Craig family are connected with the business. John Craig, Sr., and his sons John F. and George L., founded a shipyard at Toledo in 1881. He was born in Scotland and had his early training in Scottish yards. He recently celebrated his ninety-third birthday. His son John F. moved to Long Beach, California, and founded the Craig Shipbuilding Company there in 1907; and his two sons, James G. and John Craig II, are now associated in business with him.

The Long Beach yard built a score of war-time freighters, three submarines, miscellaneous craft, and some fine steel pleasure craft. The latest products of the yards are the Infanta, the Velero III, and the Samona II, considered about the finest of their type on the Pacific Coast.

San Francisco's New Police Launch



EARLY in December there was launched from the marine ways of Anderson and Cristofani, San Francisco, a sturdy though beautifully modeled launch for the San Francisco Police Department. She was named D. A. White for the late chief of police of San Francisco and was christened by the widow of that official. The craft was 100 per cent. complete, with engines running and propellers turning over, when she took the water.

This craft, designed by Lee and Brinton, naval architects of San Francisco and Seattle, is 60 feet long and of 14 feet beam. She has roomy cabin accommodations and is a comfortable, seaworthy craft, with an able power plant providing plenty of the reserve "kick" so useful in a stern chase.

This power plant consists of two Hall-Scott "Explorer" gasoline engines. With six 5-in. bore by 7-in. stroke cylinders, these motors are rated at 175 horsepower each and actually develop 190 horsepower. They are each equipped with 3 to 1 reduction gear for connection to the propeller shaft thereby enabling the use of large, moderate speed propellers of good efficiency. These reduction gears incorporate a specially designed Hall-Scott reverse element that gives sufficient increase in speed to take care of the loss in tractive effort in reversing the propeller.

The gears are helical cut, case hardened, nickel steel, with 5-inch faces and running in oil in a water-jacketed gear box. Each pair is tested for silence on a special running-in stand where every noise or hum may be easily detected. Clashing of gears when shifting to reverse is eliminated by a brake arrangement which slows down or

stops the propeller shaft when the clutch is released.

The tail shafts, furnished by the American Brass Company, are 2-3 8 inches diameter and 24 feet 6 inches long of Tobin bronze and fitted with manganese bronze couplings. These are carried on Goodrich Cutless Rubber Bearings through the outboard struts.

Through a system designed by Harold Lee, of Lee and Brinton, this power plant is completely controlled from the pilot house and the engines may be independently or jointly started, stopped, or reversed as easily as an automobile is handled by the driver.

On exhaustive trials on San Francisco Bay, the engines drove the hull at 16 knots with sufficient reserve power to practically guarantee that speed in any weather.

D. A. White is a San Francisco home product in design, construction, and propulsion plant. She is a ship-shape, well found craft in every particular. The San Francisco Police Department may well be proud of this latest addition to its floating equipment.

Vessels to be Scrapped. — The Shipping Board has announced that

bids will be opened in Washington, D.C., at noon, January 28, for the sale for scrapping purposes of the steamers Mount Vernon and Monticello, formerly German liners. The Mount Vernon, formerly the Kronprinzessin Cecile, is a vessel of 18,327 tons gross register, built in Stettin in 1906. She is 685 feet long and 72 feet beam. The Monticello, formerly the Kaiser Wilhelm II, is of 19,361 tons gross, built in Stettin in 1902. She is 684 feet long and 72 feet beam.

Proposals for the reconditioning of these two vessels have been made at various times, but the cost seemed excessive when the probable earning power of the vessels was taken into consideration. The scrapping of these vessels would release for ordinary Shipping Board uses a fund of \$3,500,000 set aside for their reconditioning. Some of the equipment, auxiliaries, and other materials will be reserved from the sale.

Aid for Cargo Vessels.—Among its recommendations to Congress, included in its annual report as of December 1, the United States Shipping Board recommends that some form of government aid should be provided for American cargo ships not benefited by mail contracts, in order to lower the operating differential which now handicaps these vessels in competing with ships owned and operated by foreigners. The report also contains recommendation that legislation should be enacted to provide for award of ocean mail contracts to purchasers of Shipping Board services, substantially along the lines of H. R. 9592, 71st Congress; and that the award of ocean mail contracts should not be permitted to be awarded to American lines operating foreign-flag ships in competition with American flag ships,

Hall-Scott "Explorer" type 6-cylinder gasoline engine as installed in the new San Francisco police boat.



substantially as provided in H.R. 8361, 71st Congress.

The report further recommends the amendment of Section 409 (b) of the Merchant Marine Act (1928) so as to authorize higher rates of pay than now provided for mail-carrying vessels whose speed is in excess of 24 knots.

The report contains numerous other recommendations designed to better the working arrangements of the Shipping Board and to enable American vessels to compete with foreign lines in the carriage by water of American products and American citizens.

Proposes New Ship Inspection Code.—In his annual report, issued in December, Supervising Inspector General of the United States Steamboat Inspection Service, Dickerson N. Hoover, has incorporated some recommendations which he claims will greatly increase the efficiency of the service. His chief recommendation is provisions for passing on plans of hulls and boilers by a staff of experts at the central office in Washington in lieu of the present system of examination of the completed work by field inspectors. Modern developments, according to the report, have made it necessary, from time to time, to amend the existing statutes covering boiler construction and inspection. At the present time a new code is being formulated and its authorization by legislative act will provide regulations covering boilers and machinery in the United States second to none, and operation of the new code will make it desirable to have the boiler plans reviewed in the central office. Inspector Hoover reported that a considerable decrease in loss of life at sea is shown for the fiscal year ending June 30, 1931.

Launches Tuna Schooner.—The Lake Union Dry Dock & Machine Works, Lake Union, Seattle, Wash., launched the 126-ft. tuna schooner *Esperito Santo* on December 21. The vessel is building for Portuguese fishermen of San Pedro and is engined by Western-Enterprise diesel engine.

New Diesel in Tug.—The first installation of the new Estep diesel engine was made in the tugboat *Leonie* owned by the Pioneer Towing

Company of Seattle. The engine was built by A. C. Estep, the inventor, in Seattle. It is an engine of 4 cylinders, 2 cycles, opposed piston type, developing 75 horsepower, with automatic ignition and cold starting.

Mr. Estep is well known on the Pacific Coast as an inventor and builder of diesel-type engines. In the development of this new engine he has associated with him E. G. Spelger and several other well known Seattle men, and the company is incorporated under the name of the Estep Engine Company.

Overseas Ferries.—The Shipping Board November 27 approved the application of Seatrain Lines, Incorporated, a corporation of the State of Delaware, for loans from the Construction Loan Fund to be used in aid of the construction of two new vessels to be used in Ocean Mail Contract Service on Route No. 56 from New Orleans to Havana, Cuba, and other foreign service. The total cost of each vessel will be \$1,586,250, including commercial appliances. Each vessel will be approximately 473 feet long, 63½ feet beam, and 22 feet draft with approximately 8445 dead-weight tons. They will be equipped with geared turbine propelling machinery having a normal shaft horsepower of 6500 and will have speed of approximately 15 knots.

The vessels will be constructed in the yards of the Sun Shipbuilding and Dry Dock Company, Chester, Pa. The Seatrain Lines, Inc., will take over all the assets of the Overseas Railways, Inc.

Rubber Bearings.—Goodrich Cutless Bearings are used on the new 50-foot steel diesel tugboat being built for the United States Engineers, New York, by Jacobson and Peterson, Inc., Brooklyn. The boat is equipped with bearings for two 3¼-inch shafts.

Trade Notes

New Vice-President.—An announcement of interest to the entire shipping fraternity is made by United Dry Docks, Incorporated, in naming Thomas J. Farley a vice-president of the corporation.

Since 1913 Mr. Farley has been a member of the firm of Edward P.

Farley & Co., steamship owners and brokers, and he enjoys a wide acquaintance among ship operators on the Atlantic and Pacific coasts and abroad, as well as on the Great Lakes. Mr. Farley traveled extensively in this country and abroad and was an officer in the United States Navy, attached to the convoy service, during the World War. His experience of twenty years as shipowner and operator, as well as early training in shipyards, constitute valuable background for the work which will come under his supervision.

Noise Consulting Service.—The Maxim Silencer Company of Hartford, Connecticut, has established, as an addition to its regular business, a consulting service specializing in the solution of noise problems. It is headed by Dr. Hiram Percy Maxim, the inventor of the Maxim Silencer, and has at its disposal the services of the entire engineering and research staffs of the company. It should be interesting news to many engineers who frequently encounter difficult noise problems. The Maxim noise consulting service will make available to them twenty years of specialized experience in working out solutions for every kind of a noise problem.

New Lines for De Laval-Pacific.—George Stoddard, manager of the industrial and marine sales division of De Laval Pacific Company, announces that effective January 1, 1932, his organization has become exclusive distributor of Northern pumps for the entire Pacific Coast and the Orient. The De Laval Pacific Co. maintains offices in Seattle, San Francisco, and Los Angeles, and has agencies in Hawaii, Japan, China, and the Philippines.

Another important marine product added to the De Laval-Pacific industrial lines is exclusive representation for the West Coast and Orient for the King Seely Corporation of Ann Arbor, Michigan, manufacturer of the K-S telegage, which gives remote reading of ship draft fore and aft, and which is widely used by a number of tankers for gauging tanks. The K-S telegage can be used for all liquids. It is interesting to know that this type of gauge is used on United States Navy submarines. A tanker of the Union Oil Company is similarly equipped.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of December 1, 1931

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W., Seattle, Wn.

Not named, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Bell St. Terminal, Seattle, for Alaska Service; 210 L.B.P., 41 molded beam, 21'6" molded depth; 16 loaded draft; 1500 H.P. McIntosh & Seymour diesel eng.; 14 knots speed; launch 1/10/32 est.

GENERAL ENGINEERING & DRY DOCK CO.,

Oakland, Calif.

Purchasing Agent: A. Wanner.

Marshall C. Harris, hull 26, suction dredge for American Dredging Co., San Francisco; 150 L.B.P.; 45 beam, 12 depth, keel 11/23/31.

U. S. NAVY YARD,

Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD,

Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: stmr. Virginia, La Perla, Point Caleta, stmr. schr. Chehalis, U.S.C.G. cutter Tahoe, Shell Barge No. 5, barge Martinez, stmr. P. H. Hillman, San Mateo, Matsonia, U.S.S. Tennessee, stmr. Saramacca, Nelson Traveler, J. C. Fitzsimmons, m.s. Varanger, stmr. Ranella, m.s. Ontariolite, ferry Coronado, barge Los Angeles, stmr. Manatawny. Pipe repairs: whaler Clement, stmr. Matthew Luckenbach, m.s. Satanta, m.s. Brunswick, Standard Arrow. Miscellaneous repairs and dry-dock: m.s. Silverpalm. Repair supercharger: stmr. Katsuragi Maru. Make and machine one C.I. flanged tee: stmr. Deroche. Pump repairs: Julia Luckenbach. Renew C. S. Tiller: m.s. Kurama Maru. Repairs to anchor chain: stmr. Oleum. One bronze propeller: stmr. Nelson traveler. Install contrapropeller: stmr. San Mateo. Furnish turbine parts: stmr. President Wilson. One tailshaft and nut: stmr. Golden Cross. Miscellaneous: launches Anadir, Horizon, Standard II, m.s. New Zealand, launch Greenland, Ubuyu Maru, m.s. Silverbeech, Silvergauva, stmr. President Coolidge, Suriname, Shoyo Maru.

GENERAL ENGINEERING & DRY DOCK CO., Oakland, Calif.

Alameda Plant, Drydock, engine and deck repairs: oil s. Yuba; Drydock, engine repairs: ferry Issaquah; Engine and deck repairs: Union Barge 1923.

Oakland Plant, Drydock, engine, and deck repairs: stmr. Coalinga, Lake Miraflores, gas s. Associates, stmr. American Star, Drydock: Union barge 1923. Drydock and minor repairs: stmr. Lumberman, gas s. Gracie S. Drydock, engine, deck, and damage repairs: stmr. Tahoe, stmr. Dan F. Hanlon.

THE MOORE DRY DOCK CO.,

Oakland, Calif.

Drydock, clean, paint, stmr. Absaroka (also repaired rudder and other misc. repairs), stmr. San Pedro (also change wheel, etc.), St. Helena, stmr. Nebraskan (also voyage repairs), C&H barge. General alterations and install new engine yacht Zodiac. Drydock for tail shaft work: m.s. Patterson, Duchessa d'Aosta. Drydock, paint, misc. repairs: C. G. cutter Golden Gate, dredge San Pablo. Drydock, repair hull barge Maltha. Drydock, paint, misc. repairs: ferry Golden Bear. Drydock, paint: Havaside No. 5, Golden State, Santa Catalina.

PRINCE RUPERT DRY DOCK & SHIPYARD,

Prince Rupert, B.C.

Docked, cleaned, painted, misc. hull and machinery repairs. 9 fishing boats. Misc. hull and machinery repairs not requiring docking: 2 fishing boats.

TODD DRY DOCKS, INC.,

Harbor Island, Seattle, Wn.

Grounding damage repairs: stmr. Admiral Nulton. Drydock and misc. repairs: stmr. Point Chico, President Madison. General repairs: U.S.C.G. Redwing. Heavy weather repairs: stmr. Seisho Maru. Misc. repairs: stmr. San Julian, Seattle.

UNITED STATES NAVY YARD, Bremerton, Wn.

Misc. repairs and docking: West Virginia, Colorado, Litchfield, Dent. Repairs to stem: Neches. Docking and change of propeller: Eagle No. 32. Misc. repairs incidental to operation as district craft: Mahopac, Tannuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS

Bath, Maine

Aletes, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels, keel 6/10/30, launched 4/10/31; deliver 1/15/32 est.

Hull 147, twin screw, steel patrol boat for U. S. Coast Guard; 165 ft. long, diesel eng.; keel 5/1/31, launch 11/9/31 delivered 11/27/31.

Hull 148, same as above; keel 5/6/31, launched 11/28/31; deliver 12/24/31 est.

Hull 149, same as above; keel 5/9/31; deliver 1/18/32 est.

Hull 150, same as above; keel 5/14/31, deliver 2/12/32 est.

Hull 151, same as above; keel 5/20/31; deliver 3/9/32 est.

Hull 152, same as above; keel 7/22/31; deliver 4/3/32 est.

Hull 153, same as above, keel 9/15/31, deliver 4/28/32 est.

Dewey, U. S. Torpedo Boat Destroyer

No. 349 for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT, Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20 1/2 knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/31.

Monterey, hull 1441, sister to above; launched 10/12/31.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17 1/2 knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launch 10/25/31 est.

Quirigua, hull 1445, sister to above; launch 11/14/31 est.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORP., LTD.,

Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft. McIntosh & Seymour diesels.

COLLINGWOOD SHIPYARDS, LTD., Collingwood, Ontario

Purchasing Agent E. Podmore

Not named, hull 87, hydrographic survey vessel for Canadian Government, 214 L.B.P.; 36 beam; 12 mi. loaded speed twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.; keel 8/12/31.

Repairs: Tail shaft drawn for examination, lower half of stern bearing re-lined: stmr. Livingston.

DEFOE BOAT & MOTOR WORKS
Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.
Not named, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W.T. boilers; keel 12/15/31 est.; launch 4/15/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY,
Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.
Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; 29 delivered.

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hull 1134, one 24-in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept.; 115x28x7'6".

Hull 1137, one steel deck barge for U. S. Engineers, Office, Norfolk Va.; 100x30x8'6".

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launch Feb./32 est.

Santa Paula, hull 122, sister to above; keel 8/4/31; launch Apr./32 est.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel Feb./32 est.

HOWARD SHIPYARDS & DOCK COMPANY,

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Mark Twain, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launched 8/29/31, deliver 12/21/31 est.

Not named, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Five cargo barges for Inland Waterways Corp.; 230 x 45 x 11 ft.; 3 delivered.

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6".

Captain William Clark, same as above.
One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9".

MIDLAND BARGE COMPANY,
Midland, Penn.

Eight floating steel caissons for Foundation Co.; 3 delivered.

Repairs: 8 barges, 9 scows for U. S. Government.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 260, dredge for stock; 140 x 36 x 9'; keel 11/16/31; launch 1/11/32 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launched 8/15/31; deliver 12/12/31 est.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31; delivery 1/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; launched 11/14/31; deliver 7/32 est.

Not named, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/32 est.; launch 8/32 est.; deliver 12/1/32 est.

Not named, hull 348, sister to above; keel 4/32 est.; launch 7/32 est.; deliver 12/15/32 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31; launch 1/32 est.; deliver 5/32 est.

Acadia, hull 351, sister to above; keel 8/31/31; launch 2/32 est.; deliver 6/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/5/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Walter Wyman, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor; keel 8/1/31; launched 11/5/31; deliver 3/1/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Mercury Sun, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; deliver 12/15/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Not named, hull 146 single-screw steamship for carrying loaded railwaycars for Seatrains Lines, Inc., New York and New Orleans; 464'6" by 63'6" by 38'3"; 15½ knots speed; 8500 D.W.T.

Not named, hull 147, sister to above.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launched 10/7/31; deliver 2/15/32 est.

Trade Notes

New Marine Service Firm.—Marshall McGinitie and A. H. McDonald have opened an office as marine surveyors in the Ferry Dock Building at Seattle, Washington. Both men have had extensive marine experience. Mr. McGinitie, until recently diesel sales manager for the Washington Iron Works, was port engineer for the United States Shipping Board for five years. His specialty will be diesel-powered ships. Mr. McDonald has had much ship repair work as plant superintendent of the Winslow Marine Railroad for over fifteen years.

Gulf Service Station.—A sales and service station was recently established in New Orleans by Sperry Gyroscope Company, Inc., in order to facilitate the servicing of the ever increasing number of vessels in the Gulf trade. The station is in charge of Richard H. Miller and is located at 109 Tchoupitoulas Street, in the heart of the shipping district. Mr. Miller holds a marine engineer's license for both steam and diesel power and is a charter member of the Propeller Club in the port of New Orleans. He has been engaged in the marine supply and specialty business for many years and has maintained an office at the present address since 1923.

Welin in New Plant.—The plant and offices of The Welin Davit & Boat Corporation have been moved from 43-64 Vernon Boulevard, Long Island City, New York, to 8 Lister Avenue, Newark, New Jersey, effective December 1, 1931.



Marine Insurance

Edited by James A. Quinby

Exchange

The Effect of Depreciated Currency upon the Settlement of Marine Losses

THE recent difficulties of the pound sterling have again embroiled shippers and underwriters in problems which were familiar during the war. So long as the American business man knows that the pound, or kroner, or franc, is worth approximately so much in United States currency, exchange problems are relatively rare, but the moment any given foreign standard begins to "hit the toboggan," at least one party to the marine policy, invoice, or general average adjustment is sure to complain.

Marine underwriters have always sought to write their policies in a currency which was likely to remain standard. As the American dollar and the English pound have, over a long period of years, closely approached the ideal of standardization, our exchange problems affecting British currency have been confined to widely separated periods such as the one we are facing today. In the present period, the insurer who finds himself able to settle a loss in pounds has an immense advantage over one who is liable in dollars.

There are three possible methods of writing an American export policy. It may be written in dollars, in pounds sterling, or in either with an express provision for payment of losses at a given arbitrary rate of exchange. When simple particular average losses occur, the insurer under the first class of policy must pay the loss in dollars. At the present time, under such a policy, the consignee of damaged goods in London can purchase with the dollars so paid an amount in pounds far in excess of the loss which could have been recovered had the policy been written and paid in sterling.

Exchange Rate Expressed in Policy

At first glance, it would seem that the third method mentioned above, i.e., the fixed rate of exchange incorporated in the policy, offers little chance for conflict of opinion. In two cases, however, enough conflict has arisen to warrant litigation.

In *Houlder vs. Union Marine Insurance Co.*, decided by the House of Lords in March, 1922, and reported at 38 T.L.R. 515, a policy on goods and freight was written in England to cover goods carried by an American vessel from one British port in the West

Sympathy

Jeez, fellers, didja hear about poor Joe Marks?

Chief mate of the Jeffery Dodge, he was, and on the bridge

When the hooker jammed her nose on Carson's Reef. Poor Joe!

O' course, he wasn't one of them two birds that drowned,

And he didn't own no shares in the freighter or her load—

But just because he mistook Carson's Light for Triple Point,

The Inspectors sets him down for thirty days. Poor Joe!

J. A. Q.

Indies to another British port in Canada. The valuation was expressed in pounds sterling, and the policy bore the following clause:

"Claims, if any, to pay at the rate of \$4.15 to £1 sterling."

The House of Lords decided that this was an English policy, and should be settled in pounds. To reach this highly patriotic decision (the pound having dropped to \$3.74 on the day of settlement) it was necessary to give some meaning to the exchange clause. The court therefore found that the clause was merely intended to cover salvage or general average claims, which might from their nature require to be translated into dollars.

About a year after the *Houlder* case, the United States Circuit

Court of Appeals for the 4th Circuit had before it a similar question in *The Barge Detroit*, 1923 A.M.C. 754. In that case, the Marine Insurance Company had issued in England a hull policy covering a barge owned and to be used in American waters. The valuation clause read: "Hull, materials, etc., valued at \$100,000. All claims hereunder to be settled at \$4.75 to the £." The premium was at the rate of 15 per cent. and was paid in pounds at the then current rate of exchange, \$4.77.

The *Detroit*, during the term of the policy, sank and became a total loss. At the time of the loss, the pound sterling had dropped to \$3.37, and the underwriters, relying upon the *Houlder* case, offered to pay the loss in pounds at the rate of \$3.37. This magnanimous gesture being refused, the parties proceeded to court. The American court, not to be outdone in patriotic fervor, succeeded in distinguishing the *Detroit* from the *Houlder* case and allowed the owners to recover at the stipulated exchange of \$4.75. There was a great deal of talk in both cases about the policies being "English policies" or "American policies," which, at this distance, seems quite beside the point. If a policy clearly provides for payment of losses at a specified rate, as the policies in both cases apparently did, there seems to be no reason to doubt that the parties intended to use that rate in settling losses. If the sterling rate had risen, the underwriter would have gained an advantage.

In General Average

Whenever exchange fluctuates, one party to an in-

FIREMAN'S FUND

Insures Hulls, Cargoes,

HEAD OFFICE: CALIFORNIA and SANSOME

EUROPEAN MARINE AGENCY

King William Street House,
Arthur Street, London, E.C. 4

Messrs. Joseph Hadley & Son, Agents

E. A. VALENTINE, Resident Agent for Oregon

714-715 BOARD OF TRADE BUILDING

PORTLAND, ORE.

FRANK G. TAYLOR, MANAGER, PACIFIC NORTHWEST BRANCH

ternational settlement is bound to lose. Nowhere is this more clearly shown than in the field of general average. A shipowner may incur expenses at one rate of exchange, and face an entirely different rate by the time the adjustment is stated. In *The Arkansas*, 1928 A.M.C. 1453, affirmed at 31 Fed. (2d) 658, a vessel owned by a Danish corporation stranded on a voyage from Norway to Boston. General average expenditures were incurred in England and Norway. These expenditures were settled by the ship's agents by the purchase of drafts payable in the currency of England and Norway. For these drafts they paid Danish kroner at the then current exchange rate. The voyage terminated in February 1924, and the adjustment was completed in March 1925. The adjusters allowed the shipowner reimbursement in dollars for Danish kroner at the rate of exchange prevailing at the date of closing the adjustment.

As Danish kroner had depreciated between the completion of the voyage and the closing of the adjustment, the respondents (underwriters on hull) complained on two grounds, (1) that the Norwegian and English disbursements should have been allowed in Norwegian and English currency, and (2) that the rate of exchange used in the adjustment should have been that prevailing at the completion of the voyage.

The respondents prevailed upon the second point but not on the first. The court repeats what so many courts have said in general average cases—that the termination of the adventure is the date to be taken for determining the value of the property involved, as shown by Rule 17 of the York-Antwerp Rules of 1890.

It is quite apparent that the selection of an arbitrary date as fixing the exchange rate is sure to work hardship upon one of the parties to such an adventure.

In matters of this sort, where neither party is guilty of fault, and one of two innocent persons must suffer, the law has chosen an arbitrary date as the best way out of a bad situation. As Circuit Judge Hand says in the *Arkansas* case, "To the libelants, whose national currency is Danish, it naturally appears that exchange at the time of settlement will alone be a recoupment; but this would probably not seem true to an American owner, or indeed to any but a Dane. A priori there is no proper time; the matter must be fixed by some convention which will seem arbitrary to those whose interest it offends and reasonable to those whom it suits."

State Court Decides Cargo Damage Case

THE state courts of maritime states have from time to time contributed decisions which have added to the body of admiralty precedent and disproved the common belief that all maritime decisions emanate from the federal tribunals.

The Appellate Department of the Superior Court of California, in San Francisco, recently handed down a decision reversing the holding of a lower court in the case of *Blake, Moffitt & Towne vs. Luckenbach Steamship company*. The dispute arose over damage to a shipment of pulpboard dishes caused by leakage of fuel oil from a broken sounding pipe on the steamship *K. I. Luckenbach*. The vessel owner contended, and the trial court held, that the break was due to a latent defect not discoverable by the exercise of due diligence, and the ship was therefore exempted from liability by the Harter Act.

Upon appeal, it was found that due diligence had not in fact been exercised, and the vessel owner was held liable for the damage. The reasons for reversal are set forth in the following extracts from the opinion of the Appellate Court:

"The primary question thus presented on this appeal is whether the burden of proof was met by defendant by showing that the steps followed to assure complete seaworthiness were such as to constitute due diligence.

The evidence shows that the pipe, being enclosed in a wooden casing, was invisible from the deck, except at an open space of about an inch where the pipe passed through the deck into the hold. The only inspection of the pipe at Boston was a scant visual inspection, made by use of a flashlight directed through that small opening in the casing close to the flange into which the pipe was screwed. Such inspection was made together by the chief officer and the chief engineer.

Later the chief officer accompanied United States local inspectors on their annual inspection of the ship; but it does not appear that anything more than a casual inspection of the sounding-pipe was made then. At that time there was no leakage into the hold; and while it is said that the tank was under pressure, the evidence is silent as to whether the pressure was equivalent to that created when the tank was filled at San Pedro. The diligence required is diligence in making the vessel in fact seaworthy and not merely in procuring a certificate of seaworthiness.

(*The Abbazia*, 127 Fed. 495, 496; *Compagnie Maritime Francaise v. Meyer*, 284 Fed. 881, 885.)"

"As regards the sounding-pipe in this case, due dili-

INSURANCE COMPANY

Freights and Disbursements

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Manager, Southern California Marine Branch.
740 SOUTH BROADWAY
LOS ANGELES

GEORGE JORDAN, Manager
ATLANTIC MARINE DEPARTMENT
116 JOHN STREET NEW YORK

309 COLMAN BUILDING, SEATTLE, WASHINGTON.

gence would seem, under the general current of authority, to have made a hammer test, or something equivalent to it, imperative.

(The Edwin I. Morrison, 153 U.S. 199, 213; The H. A. Rock, 23 Fed. (2d) 198, 200; The Charlton Hall, 285 Fed. 640, 641; The Rappahannock, 184 Fed. 291, 293-294; Compagnie Maritime Francaise v. Meyer, 284 Fed. 881, 885.)

The cause of the break is really left to conjecture. It occurred close to the top of the flange fastened to the deck and was a clean new break. It does not appear from the evidence what the serviceable age of the pipe was, how long it had been in use, or to what extent, if at all, it had previously been tested. As is said in *The Rappahannock*, 184 Fed. 291, 294, "nothing in use will wear forever, and as time goes on every appliance of this sort draws near the end of its life."

Even if the defect was latent, it was nevertheless the duty of the shipowner to use due diligence to discover it. For even when such defects exist in an appliance, it is the purpose of the Harter Act to relieve the shipowner of liability for only those latent defects which are not discoverable by the utmost care and diligence. (*The Irrawaddy*, 171 U.S. 187, 192.)

And conjecture as to the existence of a latent defect will not be permitted to take the place of proof.

(*The Folmina*, 212 U.S. 354, 363; *The Edwin I. Morrison*, 153 U.S. 199, 212; *Navigazione Libera Triestina v. Garcia & Maggini*, 30 Fed. (2d) 62, 64.)

There is testimony that in the Caribbean Sea, the vessel encountered heavy weather for a couple of days, and that the ship rolled and twisted about. The chief officer expressed the opinion that damage was done to the pipe in such twisting. But the weather described was not such as to create a peril of the sea as understood in admiralty law, nor was any damage done to the casing or to the other appliances enclosed therein. To constitute a peril of the sea, the weather, wind, or seas must be catastrophic or of such irresistible force or overwhelming power as to be beyond the ordinary exertions of human care and skill to guard against.

(*The Giulia*, 218 Fed. 744, 746; *The Arakan*, 11 Fed. (2d) 791-792.)

Canned Heat

IT IS a well known and lamented fact that canned goods, if subjected to excessive heat in the hold of a vessel, deteriorate rapidly. The decision (unpublished) of Messrs. McCutcheon, Olney, Mannon & Greene as arbitrators in the recent case of the *Crag-*

ness shows a careful study of the liability involved where normal but not extraordinary heavy weather necessitates the closing of ventilators and the resultant high temperature of holds.

The *Cragness* sailed from San Francisco with a cargo consisting in part of 4692 cases canned pears, peaches, and salad. When the vessel discharged at Manchester in December 1930, the shipment was found to be so damaged by heat, swelling and discoloration that it was ordered destroyed by the sanitary authorities. The value of the shipment was over 5000 pounds sterling.

It appeared that for a period of ten days during the voyage, a storm was encountered which was of such severity as to damage lifeboats and interfere with the use of the galley. During this period it was impossible to open the lower ventilators. The arbitrators found that the vessel was liable for the damage, which was proximately caused by improper stowage, and that the weather encountered was not more severe than was normally to be expected on the voyage. The following extracts from the arbitration report illustrate the basis for the decision:

"Periods of varying length during which the forward ventilators would have to be kept closed, or during which it would be impossible to trim them, should not have been unexpected or considered unusual. For that matter, we do not think it would require weather of exceptional severity to make it necessary to close up the 9-inch ventilators or keep them trimmed aft. They were only 5 feet high. Certainly the saddle-back hatch alone would not provide sufficient ventilation. But whatever might be said concerning the sufficiency of the equipment, the log book is not convincing that the passage was tempestuous beyond reasonable anticipation for a winter passage across the North Atlantic. Tempestuous it was, but one cannot fairly expect such winter crossing to be without storms of real severity and, for that matter, duration also. The captain concedes that weather of the kind described would be ordinary if it came in periods of two or three days' duration, separated by intervals of good weather." . . .

"That some damage would, and did, occur while the bad weather was still ordinary, is enough to condemn the stowage as improper. Stowage of cargo must be such as to enable a vessel to carry it without damage through the weather and sea conditions which she may reasonably be expected to encounter during the voyage upon which she is due to sail. (*The Musselcrag*, 125 Fed. 786 (affirmed 141 Fed. 260); *The Erskine M. Phelps*, 231 Fed. 767.)

Having reached the conclusion that the stowage was

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improper, it is unnecessary to consider whether weather of ordinary severity becomes a peril of the sea within the definition of that term. (The *Guilia*, 218 Fed. 744; The *Rosalie*, 264 Fed. 285; The *Arakan*, 11 F (2d) 791; The *Gaupan*, 24 Lloyd's List Law Reports 355) when it persists for ten or eleven days and, if so, whether it might be possible to apportion the damage between that caused by bad stowage and peril of the sea. The cases hold that a carrier is not entitled to the benefit of an excepted peril when the damage could nevertheless have been averted by the exercise of proper care. (Clark, et al. v. Barnwell, et al., 12 How. 272; The *Freedom*, 1 Asp. 28.)

The fact that similar shipments of canned fruit stowed elsewhere on the *Cragness* upon this voyage were not injured shows conclusively that proper stowage would have prevented the damage.

For the foregoing reasons, we cannot avoid the conclusion that the ship is liable for all the damage, and that is our award."

The Marine Insurance Study Class sponsored by the Association of Marine Underwriters of San Francisco held three meetings of general interest during the month of November.

On November 2, B. R. Hart, vice-president of the Alaska Packers' Association, entertained the members with running comment and motion pictures illustrating the widespread operation of the Alaska Packers salmon fisheries and canneries in northern waters. The

pictures, which were the individual property of Mr. Hart, showed the details of both trap and net fishing, and the operations of the various types of machinery used in unloading and canning salmon.

On November 16 the class was addressed by A. W. Hughes, manager of the Union Insurance Society of Canton, and J. F. Resleure, prominent admiralty attorney of San Francisco. Mr. Hughes discussed the theory of marine underwriting, stressing the susceptibility to damage of various commodities, and the other varying hazards of ports and voyages which determine the rate of premium upon which

scientific underwriting is based. Mr. Resleure initiated the class into the mysteries of charter parties, discussing the various types of charters and their interpretation.

R. G. Johnson, San Francisco manager for Koehler, Kemp and Koehler, nationally known surveyors and appraisers, appeared before the class on November 30 to explain the duties of a cargo surveyor. After pointing out the types of damage to which various kinds of cargo were subject, he explained the steps taken by a surveyor to determine the cause of damage and the means employed to realize the highest possible salvage value and thus minimize the ultimate loss to the consignee or cargo underwriter.

As an additional feature of the meeting, a motion picture of the Hawaiian Islands was shown through the courtesy of the Matson Navigation Company.

Freights, Charters, Sales

December 16, 1931

SINCE our last report the following steamers have been fixed with grain to the United Kingdom: British str. Haxby, British Columbia to U.K., December, 24/3, Canadian American Shipping Co.; British str. Vernon City, Vancouver, B.C. to U.K./Cont., Bordeaux/Hamburg Range, Dec. 24/3, Canadian American Shipping Co.; British str. Vernon City, Vancouver, B.C., to Glasgow, Dec., Canadian American Shipping Co.; British str. Badjestan, British Columbia to Havre, Jan., Dale & Co.; British str. Brighton, British Columbia to London, Dale & Co.; British str. Carlton, British Columbia to Hull, Jan., Dale & Co.; British str. Demeter-ton, British Columbia to London, January, Dale & Co.; British str. Trevoise, British Columbia to U.K./Cont., Dec.; British str. Tiberton, British Columbia to Avonmouth, Jan., Dale & Co.; British str. Amberton, Vancouver, B. C., to London, Dec., Dale & Co.; British str. Langleegorse and Mabriton, Vancouver, B.C., to London, Dec., Dale & Co.; British str. Innerton, Vancouver, B.C., to U.K./Cont., Dec., Dale & Co.; British str. Langleetarn, Vancouver, B.C., to U.K./Cont., Dec.; British str. Daloren, Vancouver, B.C., to Greece, 28th, Dec./Jan.; British str. Lackenby, Vancouver, B.C., to U.K. Cont.,

Jan.; British str. Grainton and Newbrough, Vancouver, B.C., to London, January, Dale & Co.; British str. Rushpool, Vancouver, B.C., to Leith, Jan., Dale & Co.; British str. Simonburn, Vancouver, B.C., to Antwerp and Rotterdam, Jan., Dale & Co.

The following steamers have been fixed with grain to the Orient: British str. Rossington Court, Columbia River or Puget Sound to Shanghai, wheat \$2.85, flour \$3.25, Jan., W. L. Comyn & Sons; British str. City of Vancouver, Columbia River or Puget Sound to Shanghai, wheat \$2.85, flour \$3.25, 2nd voyage, Jan., W. L. Comyn & Sons; Danish m.s. Nordfarer, Columbia River or Puget Sound to Shanghai, wheat \$2.85 flour \$3.25, 2 voyages, Jan.

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and Mar., W. L. Comyn & Sons; Danish m.s. Asia, Columbia River or Puget Sound to Shanghai, wheat \$2.85, flour \$3.25, Feb. W. L. Comyn & Sons; Danish m.s. Lundby, Columbia River or Puget Sound to Shanghai, wheat \$2.85, flour \$3.25, Jan., W. L. Comyn & Sons; British str. Castlemoor, Columbia River or Puget Sound to Shanghai, wheat \$2.75, Feb., W. L. Comyn & Sons; Norwegian m.s. Childar, Columbia River or Puget Sound to Shanghai, wheat \$2.60, flour \$3, W. L. Comyn & Sons.

The following time charters have been reported: Swedish m.s. Sveadrott, delivery China, redelivery U. K., via North Pacific, Dec., Canadian Transport Co.; Norwegian str.

Minerva, Pacific Trade, 6 months, delivery and redelivery U.K./Cont., Bordeaux/Hamburg Range, 41/-, Dec., Canadian Transport Co.; Danish m.s. Stjerneborg, 2 trips, North Pacific to Shanghai, delivery redelivery China, \$1, Dec., W. L. Comyn & Sons.

The following sales have been reported: American str. Corrales, Coquina, and Timberman, Pillsbury & Curtis to Los Angeles Steamship Co.; American m.s. Lassen, E. K. Wood Lumber Company to W. L. Claverdon; American str. Fort Bragg, San Francisco Iron & Metal Company to Beadler Steamship Co. Ltd.; American str. Martha Buehner, A. F. Mahoney to S. Shibata. PAGE BROS., Brokers.

and Central Republic Bank and Trust Company.

Electrical Galley Equipment.—Grant Call, manager of the Commercial and Marine Equipment Division of The Edison General Electric Appliance Company, Inc., in December made a trip over the entire Pacific Coast territory. Mr. Call announced that seventeen new ships had been equipped during the present year with Edison General Electric galley ranges or auxiliaries. Six of these installations were on the United Fruit Company's ships, four on the Panama Mail ships, two on the United States Lines, three on the Export Steamship Lines, and two on the Dollar liners President Hoover and President Coolidge.

Marine sales and service for California are handled through Harold Huggins from the company's San Francisco office.

Cutless Bearings for Cutter.—Cutless rubber bearings manufactured by The B. F. Goodrich Rubber Co. are specified for the new U. S. Coast Guard Cutter No. 55 to be built for the government by the Defoe Boat and Motor Works, Bay City, Mich. The propeller shaft will be mounted in an 11-inch bearing.

District Manager of Sharples.—Following a recent announcement that Carl J. Lamb had resigned his position with Westinghouse Electric & Manufacturing Co. to join the Sharples Specialty Company, H. H. LaMent, vice-president, announces the appointment of Mr. Lamb as New York District Manager in charge of sales and service.

Trade Notes

New Sales Manager of Sperry Company.—R. E. Gillmor, vice-president and general manager of the Sperry Gyroscope Company, Inc., announces that Robert B. Lea has been appointed sales manager of that company. Mr. Lea has just returned from an extended trip to Europe, during which time he made a careful study of the conditions which affect the company's foreign business. Both Mr. and Mrs. Lea were guests at the launching of the new Lloyd Sabaudo liner Conte di Savoia, which is being equipped with the Sperry gyro-stabilizer. (See December issue, Pacific Marine Review.)

O. B. Whitaker, who has been made assistant manager of the company's Marine Department, succeeds Mr. Lea as head of that department.

Heads Fairbanks, Morse & Co.—According to an announcement just

made public by Fairbanks, Morse & Co., Robert H. Morse, formerly vice-chairman of the board of directors, has been elected to the positions of president and general manager to succeed W. S. Hovey on his resignation, December 1.

Robert H. Morse was born in Chicago in 1878. In 1895 he entered the employ of Fairbanks, Morse & Co., the firm founded by his father, C. H. Morse, beginning his career with the company as an apprentice at the Beloit factory, and, except during his military service, when he was Lieutenant-Colonel in the Signal Corps, has been with the company continuously since that time. In the thirty-six years he has been employed in positions in practically every branch of the business. Mr. Morse is also a director of E. and T. Fairbanks and Co., The Canadian Fairbanks-Morse Co., Ltd., E. & T. Fairbanks Co., Ltd.,



Newly appointed sales manager of Sperry Gyroscope Company, Robert B. Lea.



O. B. Whitaker, who now heads the Marine Department of the Sperry Gyroscope Company.



Robert H. Morse, elected to position of President and General Manager, Fairbanks-Morse & Co.

Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER



New Year opens with busy days for J. Scott Rider, manager, San Francisco Division, United Fruit Company. Mr. Rider has fleet of new ships on the way.

Zac George. The Grace Panama Mail Service, headquarters at San Francisco, has just announced the appointment of Zac T. George to the position of assistant freight traffic manager.

Mr. George recently resigned from the position of Pacific Coast traffic manager for the Luckenbach Steamship Company, a position he held for many years. He is considered one of the best men on the Pacific Coast in the marine or railroading traffic field. His cheerful personality and ability to "get things done" have won for him many admirers and close friends. The appointment of Mr. George to its traffic department should be of great assistance to the Panama Mail Line just at the time when it is preparing to launch its four fine new vessels into the intercoastal passenger and freight business.

In Seattle. The 1932 officers of the Seattle Transportation Club were installed at the December meeting of the club. These are: President, J. B. Armstrong, assistant general freight agent for the American Mail Line; first vice-president, D. R. Ostrander, general agent for the Duluth South Shore and Atlantic Railroad; second vice president, C. H. Carlander, general manager of the Puget Sound Freight Lines; secretary-treasurer, R. F. Janeck,

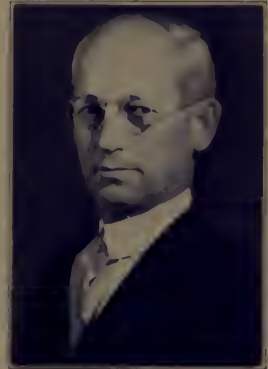
district freight agent for the McCormick Steamship Company; directors, R. J. Acheson, district manager for the Nelson Steamship Company; P. A. Aulenbacher, freight traffic manager for the Union Pacific Railroad; and L. C. Monroe, assistant traffic manager for the Union Oil Company of California.

Boat Industries. The Associated Boat Industries of California held its annual meeting at San Francisco in December and elected officers for the following year. These are: President Mott Q. Brunton, Julius Brunton & Sons Co.; first vice-president John G. Rapp, of John G. Rapp Corp.; second vice-president, W. Freeman, of Burbank Marine Sales Salon, Burbank; and treasurer, F. B. DeLano, DeLano Brothers. The board of directors is made up of: G. J. Brusher, Atlas-Imperial Diesel Engine Co.; S. K. Howe, Weeks-Howe Emerson Co.; G. J. Fletcher, Standard Oil Co. (Calif.); H. Madden, Madden & Lewis; and R. H. Haviside, of The Haviside Company.

Harbor board. Two members of the Board of State Harbor Commissioners for San Francisco were presented gold stars, emblematic of their office, at a recent meeting by President P. W. Meherin. The personnel of the harbor board were the donors.

Pacific claims. The annual meeting of the Pacific Ocean Claims Association was held at San Francisco last month on board the Grace-Panama Mail Service liner Santa Teresa. George J. Florintine of the Grace and Johnson Lines was re-elected chairman and W. G. Juergens of the Gulf Pacific Line was re-elected secretary-treasurer.

Luckenbach. Announcement has been made by M. J. Wright of the appointment of Harry C. Ewing as Pacific Coast Traffic Manager for the Luckenbach Steamship Company, with headquarters at San Francisco, to succeed Zac T.



Harvey M. Huff, general freight and passenger agent for the United Fruit fleet, is arranging reception and inspection for the Talamanca.

George, resigned. Mr. Ewing has been serving as district manager for the company at Los Angeles for the past five and a half years. He has had many years of experience in the freight and passenger business, both rail and marine, and is thoroughly familiar with the Pacific Coast field, having been born and had most of his training in San Francisco.

Ernest A. MacMahon, formerly traffic manager of Sudden & Christenson, succeeds Ewing at Los Angeles.

S. F. Bar pilots. The California State Pilot Commission in December approved the new line-up of officers within the San Francisco Bay Pilots' Association.

Captain Arthur Self has succeeded Captain Edward W. Mason as port-agent. Captain Self gained considerable fame on the Pacific as commander for many years for the Lasso Line. Captain David L. Parker succeeds Captain E. G. Freeman as Secretary. Captain H. W. Lewis retains his position in charge of assignments and communications. The Bar Pilots are now located in commodious quarters at Pier 7, San Francisco, with radio-telephone equipment whereby the dock office may keep in touch with the boat on station off the bar.

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*Santa Teresa.....	Feb. 5	Feb. 6	Feb. 29
Santa Monica.....	Feb. 9	Feb. 11	
Santa Cecilia.....	Feb. 19	Feb. 20	Mar. 14

Westbound

Ship	Leave New York	Leave Cristobal	Arrive San Francisco
*Santa Teresa.....	Jan. 8	Jan. 17	Feb. 1
Santa Monica.....		Jan. 21	Feb. 8
Santa Cecilia.....	Jan. 22	Jan. 31	Feb. 15
Santa Ana.....	Feb. 5	Feb. 14	Feb. 29

*Ports of call—Mazatlan, Manzanillo, Acapulco (north), Champerico, San Jose de Guatemala, Acajutla, La Libertad, La Union, Ampala, Corinto, San Juan del Sur, Puntarenas, Balboa, Cristobal, Puerto Colombia, Cartagena (Buena Ventura via Balboa).

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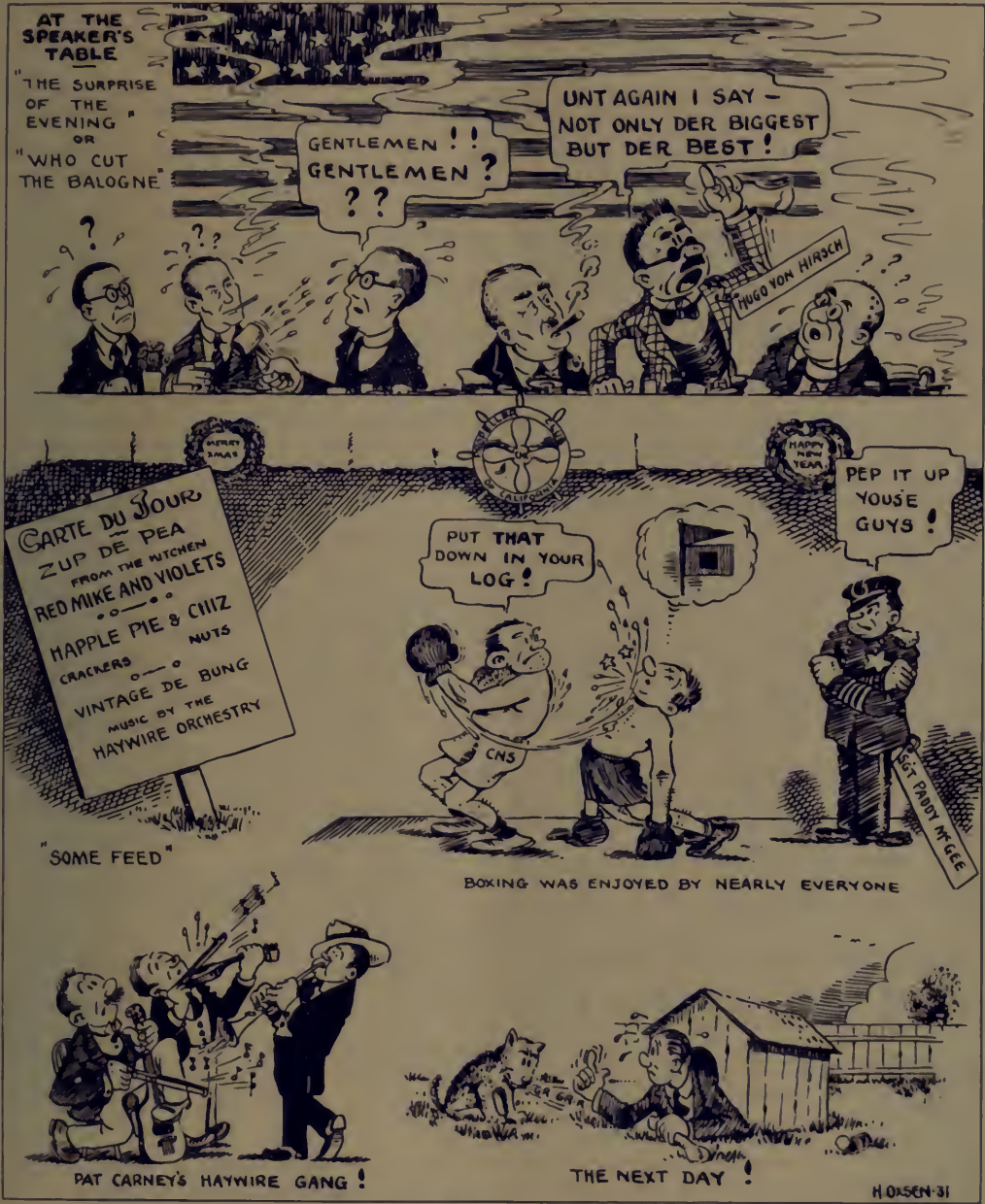


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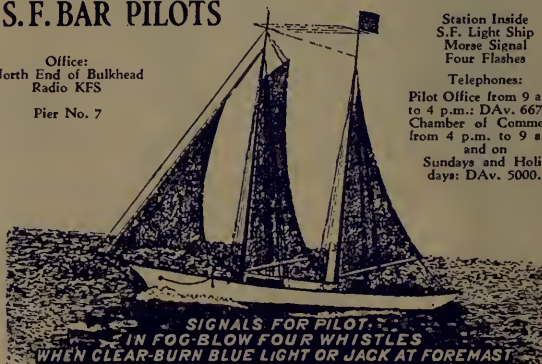
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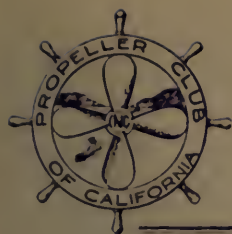
Station Inside
S.F. Light Ship
Morse Signal
Four Flashes

Telephones:

Pilot Office from 9 a.m. to 4 p.m.: DAV. 6678-9
Chamber of Commerce from 4 p.m. to 9 a.m. and on Sundays and Holidays: DAV. 5000.

And Lay Still

When on Station under Sail a White Light is carried at Mast Head. When under Power, a Red one under White; a Flare or Torch is also burned frequently.



Official News of the PROPELLER CLUB of California

all of us—The formal introduction of Hugo von Hirsch—Ralph's tribute to European engineering ingenuity—The "pay-off."

Bert Anderson, referee, master-of ceremonies, announcer.

Frank Depue as everybody's second.

Chief Quinn's tricky exponents of the noble art of self defense—Thanks, Harry Haviside—The Olympic Club matches—Spider Roche, referee—Thanks, Vernon Showell—Our Rope-yarn orkestry—Hugh Brown, Edgar Martin, Ollie Langton—The banjo wizard, Ken Carney—Thanks, for perfect lighting, to Jerry Lalor and his on-the-minute crew—Thanks, Captain Emil Topp and your husky leather throwing cadets from the California Nautical Schoolship—Thanks, Tom Forster, our efficient reservation head, for handling a record attendance—Thanks, Stanley Allen, for helping everybody!!!

The corn beef—the cabbage—the brew—

All of our smooth-working committees—

A great show, splendidly planned—beautifully fulfilled—Congratulations!

The bell of the ill-fated steamer Colombia, salvaged by Captain Gardner of the Merritt Chapman & Scott fleet, was presented to the Propeller Club through President Harry Summers of the Bilge Club of Southern California. The bell was escorted to San Francisco by Pete Harding.

The successful Christmas Jinks, enjoyed by a splendid turn-out of the Propellers, brought a goodly sum into the Clubs' funds dedicated to the Marine Hospital at San Francisco.

On Tuesday, December 22, Propeller Ambassadors of Cheer and Well Wishes spent the afternoon at the beautiful new building in the Presidio grounds dispensing gifts and entertainment. The shipping interests of San Francisco contributed a sizeable amount toward making the gifts possible. Heading the committee, James Cronin and Bert Anderson organized several units of entertainment, including the Club's own "orkestry" and "deep sea" chanty singers. Tobacco, cigarettes, candy, and other appropriate gifts were presented by Mesdames James Cronin, Herbert J. Anderson, Frank Depue, Jerome Lalor, M. H. Jaehne, Charles E. Peterson, Trevor Roberts, and Bernard DeRoche to the tune of a "cheer up" accompaniment, under generalship of Santy Claus Frank Depue.

The entire group visited twelve wards and in some cases presented as many as fifty gifts in a single ward. The committee regaled the boys with an old Liverpool chanty, while Captain Jim Gade "blew the man down" most suspiciously.

Vincent Lynch of the Police Department offered feat in sleight-of hand which "clicked" throughout the twelve wards.

Bernard De Roche acted as Master of Ceremonies, introducing the various Propeller Club acts.

Our weekly Tuesday luncheons were suspended over the holidays, but will be resumed on January 19, at the California Room of the San Francisco Commercial Club.

Early December programs met with excellent attendance. On December 1 our speaker was W. Edgar Martin of the marine department of the Westinghouse Electric & Manufacturing Company. A timely moving picture of the Dollar liner President Coolidge was displayed.

On December 8 the guest speaker was F. O. Edmunds, division construction superintendent of the Pacific Telephone & Telegraph Company. The presiding officer was President Ralph W. Myers. Mr. Edmund's topic, illustrated with a motion film, was the moving of San Francisco bay cables to make way for the trans-bay bridge. Work of our fellow member, Bill Reed, was graphically depicted in this talk and picture. We learned a lot about deep water diving.

Stanley E. Allen, our secretary-treasurer, presided at the December 15 gathering. We were entertained by Vincent Lynch, prestidigitator extraordinary, from the Bureau of Identification of the San Francisco Police Department. Mr. Lynch is a worthy exponent of the famous Houdini mysteries. We are grateful to Police Chief William Quinn and Captain Horace McGowan for arranging this heartily received amusement.

New Members:

Linn Boynton	E. B. Skinner
J. F. Gilmore	W. C. Bathelt
Captain G. Rotch	

In memoriam:

Captain Oscar Landahl	G. Sturges Barnes
Captain Robert Judson	Lon J. Reed

Retires to travel. After thirty-seven years at sea, Ernest Syder, veteran purser of the Canadian Pacific liner Empress of Japan, is going to "See the world" on his retirement the first of this year. "I've seen everything on the Pacific Coast," says he, "but there are other parts of the

world I want to visit, and so with my movie camera I'm going on a husman's holiday."

Syder, who was born in Cheshire, went to sea at Liverpool as an apprentice in sail, intending eventually to write for a master's ticket. Faulty eyesight interfered with

his plan and he transferred to the purser's department, first sailing on the old Brusmar out of Seattle to the Far East. In thirty-one years with the Canadian Pacific fleet, Ernest Syder has sailed something like 2,600,000 miles in 217 round trips between Vancouver and Manila Bay.

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International Compositions Company, Inc.

21 WEST STREET, NEW YORK CITY, N. Y.

STOCKS AT EVERY PORT OF CONSEQUENCE THROUGHOUT THE WORLD

"Howdy, Hutch!" To honor his recent appointment as general manager for Southern California of the Grace Lines' Panama Mail Service, a dinner was recently tendered Clay Hutchinson by his friends of the transportation fraternity at Los Angeles at the Hotel Alexandria. Representatives of every steamship and railway line were present. William Melroy of the Canadian Pacific acted as toastmaster. Others on the committee in charge of the affair were J. Cruickshank, C. A. Nugent, C. B. Walden, H. Wills, E. C. Albert, and J. Vincent Braga. The dinner was ample testimony to the widespread popularity of Hutchinson and his ability as a "freight getter."

1932 officers. Ralph J. Chandler, vice-president and general manager of the Los Angeles Steamship Company, has been re-elected president of the Los Angeles Steamship Association for the 1932 term. Other officers elected at the December meeting were: Eugene A. Mills, president, Crescent Wharf & Warehouse Co., re-elected vice-president; R. V. Ross, district manager, Furness Line, elected secretary-treasurer. The new board of directors comprise: F. A. Hooper, district manager, American-Hawaiian Steamship Co.; Wm. Groundwater, marine superintendent, Union Oil Company; Harold Smith, district manager, Williams, Dimond & Co.; and Harry Dorr, resident manager, Norton, Lilly & Co.

New post. Norman F. Titus, well known in Pacific Coast shipping circles, and chairman of the United States Load Line Committee and general manager of New York New Jersey Business Associates, has become president and general manager of the Hoboken Land & Improvement Company. This company was a tentative bidder for the Shipping Board piers at Hoboken and is understood to be still interested in acquiring the properties for development in connection with its other extensive waterfront holdings.

Word was received on the Pacific Coast December 28 of the death at sea aboard the steamship Chas. H. Cramp of Captain O. Olsen. The captain was well known on the Pacific Coast, having had command of Argonaut Line ships for some time.

Deep water music. Arthur Beyers, Jr., whose daddy is "Artie" Beyers of the Marine Department of the San Francisco Chamber of Commerce, is a member of the orchestra aboard the Dollar liner President Coolidge. He was previously on the President Jackson and the Venezuela of the Panama Mail Line. Young Beyers was a pupil of the famous piano maestro Hugo Munsfeldt, and comes to his music naturally; his grandfather was none other than Professor Washington Victor Plise, bandmaster at San Francisco's Mid-Winter Exposition in '94.

Engines. H. Oxsen of Fairbanks, Morse & Co., is back in San Francisco from a visit to Southern California operators and yards. He secured first hand performance data on F-M diesel jobs operating out of San Pedro and is looking into 1932 with enthusiasm. We'll have some F-M installation news in an early issue of Pacific Marine Review. When Oxsen isn't convincing engine prospects, he works out as the Coast's foremost maritime cartoonist. His style parallels "Jimmy" Hatlo of football fame!

All's well below. While in port on a recent voyage of the steamship President Hoover, new turbo-electric liner of the Dollar Steamship Lines transpacific and intercoastal service, Chief Engineer Frank P. Littlefield, reported the giant electric plant in the steamer maintaining its efficiency in every way.

"We made 18 knots coming up the coast," he said, "with the starboard generator and six boilers only. This second round voyage is proving even better than the maiden trip so far as the engines are concerned. The entire plant has worked 100 per cent. with not a moment's anxiety for the staff."

Salvage job completed. Captain John Johnson, chief salvage master of Merritt, Chapman & Scott Corporation of New York, returned to the headquarters of the company last month after completing the supervision of the salvage of the treasure aboard the wrecked Panama Mail steamer Colombia. The vessel went ashore off Point Tosco Mexico, last September. Working under difficult conditions, approximately \$200,000 worth of bullion

and coin was removed from the wreck.

Vacationing. When the Dollar transpacific liner President Wilson sailed from San Francisco for the Orient on a recent voyage, under command of Captain Makepeace Ridley, there was another master mariner on the bridge beside the skipper—but traveling as a passenger. This was Captain Chris J. Fosen, who commanded the Dollar schooner Newsboy for thirty years and who retired from active sea duty three years ago. Captain Fosen has become an enthusiastic rancher and fruit grower, and after the harvest season decided, with Mrs. Fosen, to take a little vacation trip to Manila and back.

Mariposa personnel. When the steamer Sierra of the Matson's Oceanic Line service ended a recent voyage at San Francisco, there was some scrambling on part of members of the crew who were transferred to service on the new San Francisco-South Pacific liner Mariposa. The vessel is scheduled to sail from New York on her maiden voyage in January, and her new crew was ordered East to man the vessel and become thoroughly familiar with their new jobs.

The Mariposa will be commanded by Commodore J. H. Trask; executive officer will be Captain Wm. R. Meyer; Captain R. J. Melanphy will serve as chief officer for the first voyage; he will then take command of the steamship Monterey, the second of the new Matson-Oceanic liners. Captain Melanphy will be succeeded on the Steamship Sierra by Captain C. L. Brocus, master of the Mauna Ala.

Chief Engineer is C. J. Knudsen. Tim Carroll from the steamship Ventura will be purser on the Mariposa. John Ford, Jr., from the steamship Sierra will be assistant.

Dr. S. B. Wakefield from the Sierra will be surgeon on the new ship.

Third Officer C. Potter of the Sierra goes to the Mariposa in the deck department.

Chef A. E. Speitel will have charge of the cuisine of the new vessel; and G. C. Tognotetto, former chief steward on the Maui, has been assigned to the same job on the Mariposa, with Chas. R. Nelson as tourist chief steward.



The S. S. MATSONIA

—Photo Courtesy Matson Line.

Each succeeding voyage of this sterling ship further justifies the choice of Parsons' White Brass S.A., the superior bearing metal placed in her main journals during 1929. Periodic check has proven the quality of this metal even though subjected to severe conditions imposed by high unit pressures. Detailed information covering the use of Parsons' White Brass S.A. for main bearings, eccentric straps, crank pin and other bearings of the ship may be obtained from C. V. LANE, 1005 Balfour Bldg., San Francisco.



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Paschall Station

Philadelphia



Trade Literature

S.S. President Coolidge. A beautifully printed and illustrated booklet with colored cover design has been issued by The Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa., on the exclusive subject of the S.S. President Coolidge, which, with her sister ship the President Hoover, represents the world's largest electric liner. The passenger accommodations are fully described and, in considerable detail, the excellent turbo-electric power plant which provides the lines with propulsion power and auxiliary power for all departments of the freight and passenger carrying vessel. In addition, there is a beautiful color picture of the liner in loose-leaf, suitable for framing.

Copies of this booklet may be obtained direct from the company or through the Editorial Department of this magazine.

Rego Catalog No. 57, recently published by the Bastian-Blessing Company, is a pocket size booklet of 40 pages, indexed for ready reference. It lists specifications and prices of all types of Rego welding

and cutting torches, regulators, gas economizers, acetylene generators, and the various accessories, fully describing each piece of equipment and its uses. Many helpful hints are included. The chapters on "How to Make Up a Special Outfit," "How to Choose a Torch," and "Regulators Make the Outfit" are of especial interest and of great value to every man concerned with gas welding or cutting.

Copies are available free, on request. Address this publication or The Bastian-Blessing Company, Chicago.

Racing to Market is the title of the 1932 calendar sent out by Plymouth Cordage Company of North Plymouth, Massachusetts. For many generations the competition of fishermen bringing their catches to market from the Grand Banks was so great that considerable rivalry developed and faster and faster schooners were built. Many thrilling races took place, the development of these vast vessels reaching its height in the 1890's, just before the advent of the gasoline motor. The 1932 Plymouth calendar illustration is reproduced from the oil painting by Frank Vining Smith

of the typical racing fishermen of the 90's.

Annual Report of the Hydrographic Office for the Fiscal Year 1931 has been issued in leaflet form by the Chief of the Bureau of Navigation, Department of Commerce. Copies may be obtained from the United States Government Printing Office, Washington, D.C.

The Board of Directors of the Fireman's Fund Insurance Company at its meeting on November 25, 1931, elected Edward V. Mills secretary to succeed H. P. Blanchard, whose retirement was recently announced.

Obituary. One of the best known veteran mariners on the Pacific—Capt. Jas. W. Troup—passed away in Victoria, Nov. 30, last, after a sickness of two weeks. Having been born in Portland, Oregon, his maritime career covered 56 years in the Columbia River and British Columbia. He retired as superintendent of the British Columbia Coast Steamship Service of the Canadian Pacific in 1928, and his name is synonymous with maritime history of British Columbia.

Pacific Marine Directory and Buyer's Guide

Marine Insurance.

(See Insurance.)

Marine Repairs.

Crane Packing Co. Corp., Ltd.
Crane Packing Co.

Marine Repairs (Electrical).

Edwards & Gairne, C. V. Lane, Ltd.
Edwards & Gairne, C. V. Lane, Inc.

Metallic Packing.

(See Packing.)

Mooring Fixtures and Engines.

Union Winlass Company

Motors, Electric.

B. F. Harveant Company
General Electric Company
Westinghouse Elec. & Mfg. Co.

Multicord Evaporators, Heaters, Distillers.

Crane Packing Company

Multitwirl Oil Coolers.

Crane Packing Company

Nautical Instruments.

Ford & Geirrine, C. V. Lane
The Sperry Gyroscope Company

Oakum.

Crane Packing Co.
Westinghouse Electric Company

Oil.

(See Lubricants.)

Oil Burners.

The Babcock & Wilcox Co.
Bethlehem Shipbuilding Corp., Ltd.
Ford & Geirrine, C. V. Lane, Ltd.
Ford & Geirrine, C. V. Lane.

Oil Burning Installations.

The Babcock & Wilcox Co.
Bethlehem Shipbuilding Corp., Ltd.
Ford & Geirrine, C. V. Lane.

Oil Burning Pump and Heater Sets.

Babcock & Wilcox Co.
Bethlehem Shipbuilding Corp., Ltd.
Davis Engineering Corporation.
Ford & Geirrine, C. V. Lane
Chas. C. Moore & Co., EN-
GINEERS
Western Engineering Company.

Oil Coolers.

Davis Engineering Corporation.
The Gratiot Russell Company.
Western Engineering Company.

Oiling Devices.

Ford & Geirrine, C. V. Lane.

Oil Fuel.

Standard Oil Company.
Union Oil Company.

Oil Fuel Apparatus.

Babcock & Wilcox Co.
Chas. C. Moore & Co., EN-
GINEERS
Ford & Geirrine, C. V. Lane.

Oil Purifiers.

De Laval Separator Company.

Oil Reliquification Systems.

Davis Engineering Corporation.
Western Engineering Company.

Oil Separators.

Bethlehem Shipbuilding Corp., Ltd.
De Laval Separator Company
Ford & Geirrine, C. V. Lane.
The Babcock & Wilcox Co.
Western Engineering Company

Oil, Steam Cylinder.

Standard Oil Co.

Oil, Turbine.

Standard Oil Co.
Union Oil Co.

Oronite Paints.

Standard Oil Company.

Packing

Crane Packing Company
France Packing Co.
C. E. Rhodes Co.
Thorlote Products Co., Inc.

Packing, Metallic Condenser

Crane Packing Company

Packing, Metallic.

Crane Packing Company
France Packing Co.
Thorlote Products Co., Inc.

Paint.

American Marine Paint Company
Federal Comp. & Paint Co., Inc.
L. W. Ferdinand Company
International Compositions Company

Paint, Stack.

American Marine Paint Company
Federal Comp. & Paint Co., Inc.
International Compositions Company

Paint, Waterproof.

American Marine Paint Company
Federal Comp. & Paint Co., Inc.
L. W. Ferdinand Company
International Compositions Company

Paneling.

Haskelite Mfg. Corporation
The Pantalone Company, Inc.
Pipe Covering, Cork
Armstrong Cork & Insulation Co.

Propellers.

Bethlehem S. B. Corp., Ltd.
Ford & Geirrine, C. V. Lane
Hyde Winlass Company
Warman Steel Casting Co.

Presses.

(See Firing Presses.)

Pumps.

Davis Engineering Corporation
Fairbanks, Morse & Co.
Ford & Geirrine, C. V. Lane.
Gratiot-Russell Company
Hyde Winlass Company
Kearlott Engineering Co., Inc.
Western Engineering Company

Pumps, Ballast.

Ford & Geirrine, C. V. Lane
Western Engineering Company.

Pumps, Bilge.

Ford & Geirrine, C. V. Lane
Western Engineering Company.

Pumps, Boiler Feed.

Ford & Geirrine, C. V. Lane
Western Engineering Company.

Pumps, Circulating.

Westinghouse Elec. & Mfg. Co.

Pumps, Electric.

Ford & Geirrine, C. V. Lane
Western Engineering Company.

Pumps, Electric-driven.

Ford & Geirrine, C. V. Lane.

Pumps, Fuel Oil.

Ford & Geirrine, C. V. Lane
Western Engineering Company.

Pumps, Oil.

Ford & Geirrine, C. V. Lane.

Pumps, Rotary.

Ford & Geirrine, C. V. Lane.

Pumps, Sanitary.

Ford & Geirrine, C. V. Lane.
Western Engineering Company.

Pumps (Vacuum).

Ford & Geirrine, C. V. Lane
The Sperry Gyroscope Company

Purifiers.

Ford & Geirrine, C. V. Lane.

Radio Apparatus.

Mackay Radio Tel. Co.
Eta-Inkjet & Galvan.

Reducing Gears.

(See Gear.)

Refined Oils.

Standard Oil Company

Refrigerating Machinery.

(See Ice Machines.)

Regulators (Pressure).

Ring Buoys
Armstrong Cork Company

Rings, Piston.

Kearlott Eng. Co., Inc.
Havande Company

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S.S. "POINT ANCHIA"
Swayne & Hoyt Ltd.
S.S. "IROQUOIS"
Puget Sound Nav. Co.

S.S. "CHARLES NELSON"
Nelson Steamship Co.
S.S. "MARY D"
Pacific American Fisheries
S.S. "S. A. PERKINS"
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El. 3919



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Quips That Pass in the Night

"What's the difference between a Scotchman and a banana?"

"Give it up."

"You can skin a banana."

They were stopping at a big hotel, and the wife, returning from a shopping tour, found that on their floor all the doors looked alike. She picked what she thought was the right one, knocked and whispered:

"I'm back, honey! Let me in."

No answer.

"Honey! O, Honey! I say I'm back."

Still no answer.

"O, say, Honey, let me in! You hear me, Honey?"

Then a strange man's voice bellowed from the inside: "Madam, this is not a bee hive! This is a bathroom!"

At His Leisure

Doctor—Give up smoking, Captain, and you will prolong your life by 20 years.

Captain—But isn't it too late now?

Doctor—It's never too late.

Captain—Then I'll start in ten year's time.

One on Dad

To Tom, who had been cutting up, his mother exclaimed wearily—"Why can't you be a good boy?"

"Well, Mother, I'll be good for a nickel."

Mother—"For shame, you ought to be like your father, good for nothing."

Lawyer—So these are the exact facts?

Client—Yes, and it's up to you to twist them.

Quick Thinking

A young lady of pleasing appearance, while stepping down from a street car, carefully raised her skirt to avoid tripping. As she did so, she noticed a young man who apparently was taking more than necessary interest in her movements.

Thinking to check him for his rudeness, she went up to him to speak him a piece of her mind. "Haven't I a perfect right—"

"Yes, madam," he cut in, "and if I may say so, a peach of a left, too."

When the Favorite Flops

"Isn't it dreadful? The minister's son has decided to become a jockey. He was to have been a minister, you know."

"Well, he'll bring a lot more people to repentance than he would as a minister."

The 69th Chapter of Matthew

"Folks," said the colored minister, "the subject ob my sermon dis ebenin' am Liars. How many in de congregations has read de 69th Chapter of Matthew?"

Nearly every hand in the audience was raised immediately.

"Dat's right," said his reverence.

"You is just de folks I want to preach to. Dere is no 69th Chapter in Matthew."

Super Salesmanship

The Sales Manager came upon the down-hearted Star Salesman contemplating suicide from the Brooklyn Bridge.

"Wait," said the Sales Manager, "before you commit this rash act, talk it over with me for fifteen minutes."

Whereupon the two strolled over to a bench and conversed for fifteen minutes. After which, arm in arm, they both walked to the bridge and jumped over together.

No Grade Crossing There

A train in England, the Cheltenham Flier, travels 77 miles per hour. Motorists at grade crossings are going to find it hard to hit.

Lie Detector

"I don't believe my wife could tell a lie."

"You're lucky. Mine can—as soon as it's out of my mouth."

An old codger was crossing a busy corner when a huge police dog dashed into him and bowled him over. The next instant an Austin skidded around a corner, bumped him, inflicting more severe bruises.

Bystanders assisted him to his feet, and someone asked him if the dog had hurt him.

"Not exactly," he replied, "it was the tin can tied to his tail that did the most damage."

The Big If

"What rent do you pay for your flat?"

"I don't pay it."

"But if you did pay it, what would it be?"

"A miracle."

Hi: "Why is the post office all decorated today?"

Si: "Seth Green's boy graduates from correspondence school today."

"Are you positive that the defendant was drunk?"

"No doubt," growled Officer Raynor.

"Why are you so certain?"

"Well, anyhow," replied Raynor, "I saw him put a penny in the patrol box on Fourth Street, then look up at the clock on the Presbyterian church and shout: 'Gawd! I've lost fourteen pounds weight!'"

Food for Thought

Diner: You seem to keep the hotel remarkably clean.

Waiter (beaming): I'm glad you think so, sir.

Diner: Yes, everything I eat tastes of soap.

He's Crazy

Insurance Inspector: Would you mind telling me if there is any insanity in your family, lady?

Wife (a policy seeker): Well, no, not exactly. Only my husband thinks he's boss at home.

If At All

According to statistics there are 4.1 persons in the average Canadian family. The .1 is usually referred to as "father."

Chinaman: You please tell me where is car barn?

Conductor: What's the matter, John, you lost?

Chinaman: No, me here. Car barn lost.

Proof Enough

Judge: Do you know anybody who can vouch for your good character?

Accused: Yes, the chief of police.

Judge: But he says he doesn't know you?

Accused: What more do you want? I've lived in this neighborhood for 20 years and he does not know me!

Modern Child

Her Mother: Betty, how would you like a new doll? One that says "Mama" when it's squeezed.

Betty: I want one that says, "Be yourself, big boy."

In a Hurry

A man was seen to jump from a third story window. A spectator hurried to the rescue to find the jumper only slightly hurt.

"Why did you jump from that height?" he asked.

"Because a woman lied to me," the jumper replied.

"Lied? What do you mean?"

"She told me her husband was not in."

Pacific Marine Review

FEBRUARY, 1932



Official Organ
PACIFIC AMERICAN
STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION
OF THE PACIFIC COAST



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EVAPORATOR



OIL HEATER



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WATER PLANT



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To Consulting Engineers, Marine Surveyors, Naval Architects, Operating Engineers and Shipbuilders, we desire to state that the MERITS AND DETAILS OF CRESCENT PRODUCTS will disclose MANY IMPORTANT FACTS, a few of which are sufficient to justify their adoption.

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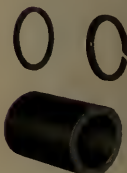
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& GREASE EXTRACTOR



TUBE CLEANER
CUTTER WHEELS



WOODITE TYPE RINGS



OIL PUMP SETS



WATER HEATER
ELEMENTS

Pacific Marine Review

VOLUME XXIX

FEBRUARY, 1932

NUMBER 2

New Queen of South Pacific Mariposa and Her Builders



W. P. Roth, president, Matson Navigation Company.



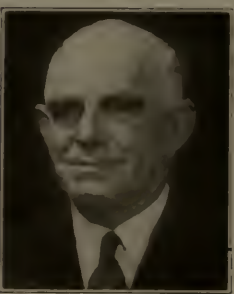
S. W. Wakeman, vice-president, Bethlehem Shipbuilding Corporation.

TABLE OF CHARACTERISTICS

Length over-all	631' 6 5/8"
Length on D. W. L.	628' 0"
Length B. P. (to C. L. of rudder stock)	605' 0"
Breadth molded	79' 0"
Breadth extreme, over B deck	82' 1 1/2"
Depth molded to B deck	61' 0"
Depth molded to C deck	52' 9"
Depth molded to D deck	44' 6"
Draft, molded, to D.W.L.	28' 0"
Displacement, to D.W.L.	26,141 tons
Gross tonnage, U.S.	18,017 35
Net tonnage, U.S.	10,580
Cargo capacity—general	215,013 cu. ft.
Cargo capacity—refrigerated	34,629 cu. ft.
Baggage and mail	29,974 cu. ft.
Fuel oil capacity—total	6,606 tons
Fresh water capacity	2,439 tons
Drinking water capacity	430 tons
Passengers, first class	475
" cabin class	229
" total	704
Crew:	
Deck department	16
Engine department	46
Steward's department	240
Purser's department	12
Medical department	3
Watchmen	12
Total	350
Total persons on board	1063
Shaft horsepower, normal	22000
Service speed, knots	20 1/2
Contract signed	25 October, 1929
Keel laid	11 June, 1930
Launched	18 July, 1931
Delivered	14 Dec., 1931



A. C. Dierickx, vice-president, Matson Navigation Company.



H. E. D. Gould, general manager, Bethlehem Shipbldg. Corp.





With beautiful lines below and aloft, the Mariposa makes very little disturbance at full speed.

A New Queen of the South Pacific

*New Matson Liner Mariposa Combines Luxury with Safety
and Achieves Speed with Economy*

IN order to keep pace with the great advances in the requirements of transpacific and Australian travel in recent years, particularly as regards luxuriousness of equipment and comfort of passengers, the Matson Navigation Company of San Francisco in 1928 decided to proceed with the building of two steamers of the most efficient and modern type for their Australian and New Zealand Service.

Tentative plans and specifications for these ships were developed by the Matson company and their consultants, Hugo P. Frear, naval architect, and John F. Metten, marine engineer. Prices were obtained from various shipyards, the Bethlehem Shipbuilding Corporation, Fore River Plant, being low bidder. Preliminary approval of these plans by the Shipping Board and Navy Department was then obtained, and a mail contract was awarded in due course. In conjunction with the Fore River Plant technical staff final arrangement plans and detail specifications were prepared and a contract for the two vessels was signed on October 25, 1929.

Throughout the preparatory work constant study was expended on the part of both the operators and builders to develop a design which would combine maximum comfort to the passengers with the utmost in operating efficiency available through recent engineering developments.

The behavior of the Steamship Mariposa on her trials and on her maiden trip to New York leaves no doubt as to the comfort of the passengers; and an examination of the excellent results obtained on the measured mile trials held at Rockland, together with the consumption figures from the economy run, demonstrate that this vessel has established new high standards for efficiency among vessels of her size and type and justify very definitely the choice of hull form and type of propulsion.

Mariposa is a vessel of 628 feet water-line length, of

79 feet molded beam, and 52 feet 9 inches molded depth to C deck. She is of the complete superstructure type, having nine decks, four of which are for passengers almost entirely. She is a twin-screw ship driven by geared turbines, steam being provided by water-tube boilers in two firerooms. She has accommodations for 700 passengers. Her designed service speed at load draft is 20½ knots and her load displacement is 26,141 tons.

Built under the provisions of the Jones-White Act, she is fitted for service as a naval auxiliary in time of war, subdivision being to excess of the requirements of the 1929 Convention for Safety of Life at Sea, particular study having been given to the matter of stability in damaged condition. In this connection also her steering gear is located below the water line, and provision has been made for the fitting of gun foundations should these be required. The extremely large fuel capacity of some 6600 tons should be of special value for naval service, the vessel being capable of making the round trip between San Francisco and New Zealand without refueling.

Hull, machinery, and equipment have been built to the latest rules of the American Bureau of Shipping and under their survey, the vessel being classed *A1E A. M.S.

The design of the public spaces and staterooms, including their decorations, throughout the vessel is the work of the firm of Warren Wetmore and Co. of New York, designers of the famous Royal Hawaiian Hotel in Honolulu, while all interior joiner work has been manufactured and installed by the firm of Hopeman Brothers of Rochester, New York, who executed similar work for the Malolo. The interiors have been designed and executed with special thought for the comfort of the passengers in tropical climates, the rooms being exceptionally large and airy and decorated in

such a manner as to give a particularly pleasing and cool effect.

Report of Trials

The official trials of the steamship *Mariposa* were conducted on the 10th and 11th of December 1931. The performance exceeded the contract requirements by ample margins. The trials consisted of fourteen runs over the measured mile off Rockland, Maine, at speeds varying from about 14 knots to maximum and a 12-hour full endurance and economy run.

On standardization, for the mean of the three high runs, the speed was 22.27 knots at 132.1 revolutions per minute and 28,130 shaft horsepower; and the highest run was 22.84 knots at 132.5 revolutions per minute and 28,450 shaft horsepower.

During the economy run the ship was operated as in normal service with all heating, ventilating, refrigerating, and galley equipment in use so far as practicable and with a generator load of 556 kilowatts. The average shaft horsepower was 22,113 at 124.7 revolutions per minute. During the last five hours of this run the oil consumption for all purposes per shaft horsepower of main turbines, corrected to 19,000 B.T.U., was 0.627 pound.

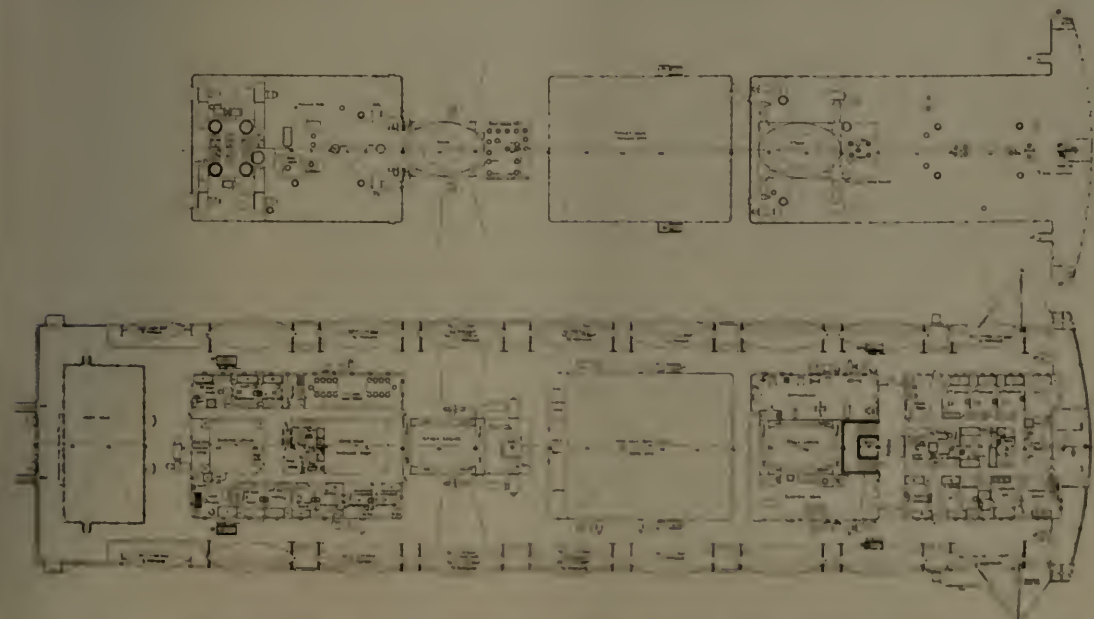
General Arrangement

The hull of *Mariposa* is divided into thirteen main compartments by twelve water-tight bulkheads, these being the bulkheads on which calculations for floodable length were based. Fuel oil tank and other minor bulkheads give still more subdivision.

This arrangement provides two large cargo holds forward, just aft of the collision bulkhead and fore peak tank; each hold is served by a hatch of generous proportions. Cargo space is provided well down in the ship. The upper part of these main compartments, on E deck and above, are used for accommodations for crew. A large block of fuel oil tanks, above and separate from

the inner bottom, comes next to the cargo space; then the forward boiler room. Another block of fuel oil tanks separates the forward and after boiler rooms. Then comes an auxiliary machinery space in which are located pumps and generators and the like and which is flanked by oil tanks at the side of the ship. The main engine room comes next, followed by refrigerating machinery space and fresh and drinking water tanks. These tanks run aft beside the propeller shafts. At the after end of the hold is a trimming tank. Refrigerated cargo space is provided aft; also space for a considerable amount of general cargo. Refrigerated ship's stores are near the refrigerated cargo and machinery space. Other ship's stores, laundry room, baggage spaces, mail room, and tailor shop fill in where convenient on lower decks between the forward and after holds.

The main dining saloon, galley, pantries, and cabin class dining saloon are located amidships on E deck, the first deck wholly above the deepest load water line. D deck, C deck, and B deck are given over mainly to staterooms. Deck A has ten de luxe staterooms forward, eight of which have "lanais" or private enclosed verandas. These rooms may be made up into suites as desired. The rest of Deck A is given over to public spaces and provides an extensive promenade, a library, a writing room, a large lounge, an extensive smoking room, a men's club-room and bar, and a dance pavilion and palm garden which extends the full width of the ship and has large windows on three sides. On the boat deck, next higher than Deck A, are the navigating spaces, officers' quarters, and radio room, in a house forward; accommodations for engineer officers and the officer's mess room amidships; and for the passengers, a well equipped gymnasium and an electric bath, as well as a large amount of promenade deck space. A tennis court is found on top of the house over the main lounge, and a large sport deck is arranged above the dance pavilion.



Plans of boat and bridge decks, Steamship *Mariposa*. Inboard profile and plans of all other decks will be found opposite Page 56.

The cabin-class is given exceptionally fine accommodations, the staterooms here being as well appointed as those of the first-class. For the use of the cabin-class there is provided a very comfortable and attractive lounge, a large and attractive smoking room, a veranda enclosed on three sides, and a generous amount of deck space, all in addition to the cabin dining saloon mentioned above.

Each class of passengers has at its disposal a large open air swimming pool and many awnings are provided for shelter in hot weather.

Mariposa is a ship of the complete superstructure type, with a short well deck forward and a forecastle. The deck houses are carried well aft and end gradually, one after another, in order to avoid a "chopped off" appearance. The two stacks are spaced far apart, about equidistant from amidships, and, with the masts symmetrically located, give the ship a very well balanced appearance. Above her green boot-topping, Mariposa is painted glossy white from stem to stern. A narrow band of blue follows the sheer line the full length of the ship. Other trim is blue and light buff, typical of the Matson Line. Her well proportioned stacks are painted light buff with blue tops and carry the large blue "M" of the owners. Deck house sides behind covered promenades and on the boat deck, and their ends, are painted light buff too; and the whole appearance of the ship is of dignity and neatness, with a very jaunty and live sheer and a curved stem suggestive of the modern cruiser yacht profile. She has a slightly curved stem, raking forward, and the nearly vertical cruiser type of stern so frequently seen of late; and is, in these points, very similar to her predecessor, Malolo.

Mariposa is propelled by twin screws, which are driven by turbines through single reduction gears. Each set of turbines consists of three drums, for high, intermediate, and low pressure, respectively. Steam is supplied by twelve oil-burning Babcock and Wilcox boilers. The two propellers are solid cast bronze, 18 feet in diameter, with three stream-line blades. The hull is bossed out to enclose the shafts and shaft tubes.

Construction

The hull is built of steel to the requirements of the American Bureau of Shipping, with which all scantlings fully comply. The framing is transverse, the side frames consisting of channels from the margin plate to F deck and from F deck to D deck, and angles above D deck. Brackets connect the sections at F and D decks, which are either oil-tight or water-tight throughout. Frames are spaced 36 inches apart amidships, the spacing being gradually reduced toward the ends to 24 inches.

Double bottom is continuous from fore peak to aft peak bulkheads, and is fitted to carry fuel oil and water. Solid floors are fitted on every frame in way of the boiler and engine rooms and forward of the three-fifths length and on every third frame elsewhere.

Deck beams are fitted on every frame. Up to and including B deck, channels are used; above B deck, angles. All decks are completely plated except the boat deck, of which a portion is built with steel stringers and tie plates. All decks exposed to the weather in any part of the ship are planked with teak.

In general, four lines of pillars or longitudinal bulkheads support the decks, with longitudinal girders arranged on the pillars under each deck at each line of support.

The ship is built without the use of expansion joints, B deck being the strength deck amidships and C and D decks at the ends. To distribute properly the stresses at the forward end of the deck house, B deck is continued forward of the house for a considerable distance and the side plating is carried up to that deck, and special attention is given the continuity of structure between B and C decks. Aft, the erections end more gradually, and the strength is thus more easily transferred from B deck to C deck, and then to D deck, way aft. Over the greater part of the ship's length, the heavy side plating is carried up to B deck.

There is no tumblehome on the sides of these ships, the full molded breadth of 79 feet being carried up to B deck. On that deck, the beams are extended to overhang the side of the ship by eighteen inches either side; this increased width is maintained to the boat deck.

The boat deck is omitted over the main lounge which is thus permitted to extend through a clear space of two deck heights over the whole extent of the lounge.

Careful attention was given to the subdivision of the hull; and bulkheads are arranged in a manner which assures that the ship will remain afloat, with sufficient stability to prevent flooding undamaged compartments when at least two major compartments are open to the sea.

The stem was made up in four parts; the three upper sections are forged steel, slightly curved to the desired profile; the lower rounded part, or forefoot, is a steel casting of a shape which fairs into the slightly bulbous form of the ship's bow.

The stern is of the so-called cruiser type, the hull being faired above the rudder to the full water line length, with the rudder hung well down below the water line. In profile, the stern above the rudder rises vertically to the waterline, then rakes forward in an easy curve to D deck.

The major portion of the stern frame is of cast steel in one piece, the rudder being carried on a single gudgeon and a large rudder stock bearing. A smaller casting forms the corner of the stern at the extreme after end of the ship.

Of the balanced, streamline type, the rudder has a cast steel frame with some structural stiffening and support for the side plates. It is carefully faired, and its greatest thickness is no less than 2 feet. The rudder stock is one piece of cast steel, 2 feet diameter outside with a 10-inch core, shaped at the lower end to form a large horizontal coupling to the rudder frame. Keys and fitted bolts hold rudder and stock rigidly together. Particular care was used in the design of rudder and stock in order to develop ample strength in these parts to withstand severest conditions of service.

The fuel oil tanks are located amidships, and have greater capacity than is actually required for an entire round trip between California and Australia. Fresh water and drinking water tanks provide ample capacity to meet all requirements of passengers and crew. A pipe passage runs fore and aft through the oil tanks between the boiler rooms for the purpose of carrying steam and other piping as well as for access; and a smaller tunnel runs through the forward oil tanks to carry piping for oil and to the forward double bottom and fore peak tanks.

Access through water-tight bulkheads between compartments is obtained by steel water-tight doors, thirty-two in all, located on and below C deck. Twenty of these doors are of the horizontal sliding type and are operat-

View looking forward from the bridge featuring Bethlehem windlass, Allan Cunningham cargo winches, and the cargo handling gear. All gear on this ship is built to the stringent rules of the Australian ports. All winches must meet the fast Matson sugar discharge cycle. The motors and controls on winches and windlass are by Westinghouse.



ed electrically from the bridge or manually at the location of each door if desired. Twelve doors, none of which are located below the normal load waterline, are of the hinged type, operated by hand.

These electrically operated doors, when operated from the bridge, can be operated singly or all at once; an alarm is connected with each which rings a gong and closes a safety gate before the door itself operates.

A feature of Mariposa is that the side plating of the hull is lined with cork slabs in way of passenger accommodations, the entire length of passenger space on C and D decks being so insulated; also in way of the dining saloons and cabin passenger space on E deck. On the boat deck, the sides of the deckhouses enclosing deck officers and engineer officers' quarters, gymnasium, and electric bath are similarly treated. These cork slabs are 1 inch thick and are permanently fastened to the plating. They are, in general, covered by ornamental sheathing in quarters. Similar insulation, but of 1½-inch slabs, is used in way of the hospital spaces on E deck forward. This insulation, together with the white paint on the entire outside of the ship above water, should insure the maintenance of cool conditions in the hottest weather as well as freedom from moisture due to condensation.

All steel castings used in the construction of Mariposa were made by the Bethlehem Steel Company.

Cargo Handling

Mariposa is equipped to carry general cargo, automobiles, and refrigerated cargo. The cargo space is divided forward into two large holds, not insulated, for general cargo. Aft, there are refrigerated spaces and additional space for general cargo. Side ports are provided both forward and aft, those forward opening on to F deck, those aft into both refrigerated and general cargo space on F deck. Additional side ports are provided on E and F decks amidships for baggage, mail, and stores, and for entrances for passengers and crew. Still others are located on C and D decks for passenger entrances. All cargo forward is carried on or below F deck, the space above being used for crew's ac-

commodations. Hatches on deck serve each of the two forward holds, being carried as trunks through the crew spaces on C, D, and E decks. The upper part of No. 2 hatch, which extends to B deck, is utilized as a swimming pool for first-class passengers, water-tight steel hatch covers being fitted about on the level of C deck and proper filling and draining connections being made above. Aft, the cargo is carried on F and G decks, and is handled through a hatch from B deck. Similarly to No. 2 hatch, this hatch aft is used for a swimming pool, in this case for cabin-class passengers.

Tubular steel cargo booms are fitted as follows: on the foremast, four booms of 5-tons capacity each and one of 30-tons capacity; on the mainmast, two of 5-tons capacity each; on the forward end of the deck house two 5-ton booms; on the two kingposts aft, one 5-ton boom each.

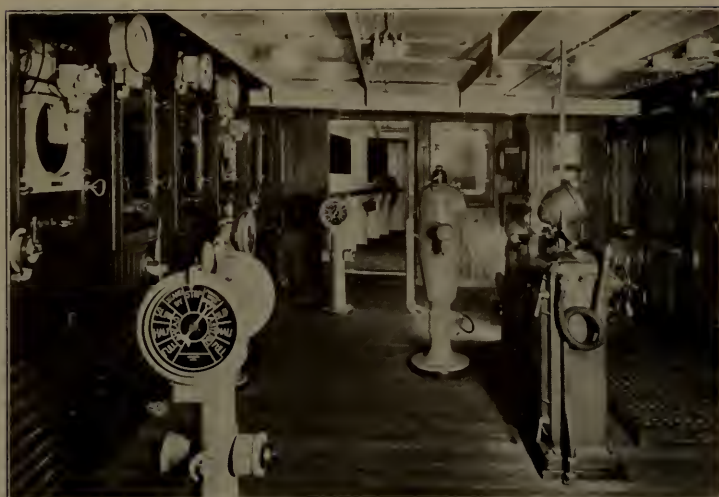
In general, all 5-ton booms will be fitted with a single whip to handle loads up to three tons; double whips will be carried, however, to enable any boom to care for loads up to five tons.

All cargo winches are electrically driven, with controls placed where each operator can run two winches and still see down into the hatch where those winches work. Winches were made by the Allan Cunningham Company in Seattle and are driven by Westinghouse motors. Two of the winches are of the double reduction geared heavy duty type for use on heavy loads on the 30-ton boom; the others are of single geared high speed type. All winch motors are rated at 35 horsepower at 300 revolutions per minute and are water-tight.

Cargo blocks and fittings were furnished by the Boston and Lockport Block Company; wire rope was made by the Williamsport Wire Rope Company.

All cargo gear is made and installed in accordance with the stringent regulations for cargo handling of the Australian government, which require each part to be marked with the load to which it has been tested and gear to be so arranged that frequent inspection of all gear is possible, and that certain steel parts can be removed periodically for annealing.

Mail is carried in a large room set aside for the pur-



The wheel house on the Steamship Mariposa is adequately equipped with the most modern navigation and maneuvering apparatus. This view features: Cory-Kent Clear-Vision screen; Henschel electric engine room telegraph; Sperry gyro-pilot, gyro-compass, course recorder, rudder angle indicator, and shaft revolution indicator; Kelvin-White standard compass; the latest type Fathometer; McNab automatic whistle controls; and McLeod hydraulic telemotor.

pose on F deck between No. 2 cargo hold and the forward boiler room. Side ports are provided in this space for ready transfer of mail at distributing points, and the passages are separated from the mail stowage space by wire mesh bulkheads. In a portion of this space there is a strong room for the stowage of specie. Mail boxes are provided in both passenger and crew accommodations.

Navigation Equipment

Much attention has been given the navigating equipment on Mariposa to ensure that the ship could be easily and safely handled under all conditions. The result is probably the most modern equipment installed on any ocean liner.

A complete Sperry gyro-compass system is provided, with master gyro-compass and controls in an electric station on the boat deck and repeater compasses in the wheel house, captain's room, radio compass room, bridge wings, port and starboard, on the flying bridge, and in the steering gear room. The gyropilot installed in the wheel house is of the double-unit type electrically connected to the power unit in the steering gear room.

Ten-inch standard compasses, furnished by the Kelvin and Wilfrid O. White Company, are fitted in customary locations, one in the wheel house and one on the flying bridge.

A Sperry course recorder is installed in the chart room. A Sperry self-synchronizing rudder angle indicator system is installed, with repeaters in the wheel house, engine room, and steering gear room. There is also a Sperry shaft revolution indicator system, with indicators in the wheel house and engine room and an electric comparator for indicating the comparative speeds of the shafts at a glance.

The latest type of Fathometer is installed, which gives a continuous record, if desired, of the depth of water in which the ship is running. This device is manufactured by the Submarine Signal Company, and the recording mechanism is located in the wheel house.

Colvuc Rubber Company's "colvuc" in plastic form was used to successfully gasket the signal tanks installed by the Submarine Signal Company on the bottom plates of this vessel.

Two motor driven sounding machines, supplied by

The A. Lietz Co. are fitted, one on either side of the navigating bridge.

Engine, docking, and steering telegraphs are of the latest alternating current naval type, and were made by Chas. J. Henschel & Company, Inc. They consist of combined engine order transmitters and indicators for each shaft at each side of the wheel house, with repeat-back indicators at each throttle valve; docking telegraph with similar repeat-back indicators taking orders from the bridge to the docking station on D deck aft; and a steering order telegraph with transmitter in the wheel house and indicator in the steering gear room. A fire room telegraph of the same make and type is installed to take orders from the central gauge board in the engine room to indicators in each fire room. Repeat-back indicators are fitted to these also. Separate duplicate motor generators with power supply from the emergency bus are provided to operate these telegraphs.

Two Sperry 18-inch incandescent searchlights are fitted, one on top of each bridge-wing shelter.

A pitometer log was supplied to the ship by the Kearfott Engineering Company, and a Walker-Trident electric log by Kelvin and Wilfrid O. White Company.

Two Kent clear-view screens, consisting of a rapidly rotating disk of glass, were furnished by the Charles Cory Corporation, and are installed in the wheel house.

McNab automatic electric whistle controls with secondary mechanical control are provided for both whistle and siren.

For hand steering from the wheel house, McLeod hydraulic telemotor control is fitted. An emergency control is fitted in the steering gear room.

The radio equipment is of the latest type and includes radio direction finder, radio transmission and receiving sets, and ship-to-shore radio telephone equipment. A radio-operated clock is installed in the radio operating room. The transmitting set is of 500 watt size. All radio equipment was furnished by the Radiomarine Corporation of America.

Pneumercators are fitted to all oil and drinking water tanks, and to other water tanks under the refrigerated cargo space where sounding is difficult. These instruments were furnished by the Pneumercator Com-

pany and record at all times the amount of fuel or water in each tank.

Ventilation and Heating System

The ventilating and heating system aboard *Mariposa* follows the latest marine practice of supplying to each stateroom and to all public rooms fresh warm or cool air, the temperature at all times being controlled by passenger or steward. This fresh air is supplied under pressure at rates sufficient to change the air in each space in times varying from three to six minutes, according to the use of the space. In this way, passengers in all staterooms, inside and outside, are assured of a constant supply of fresh air at an appropriate temperature; and may themselves regulate the amount of air supplied by means of the punkah louvers fitted in every room, which enable the passenger to direct the flow of air in any direction or to shut it off altogether. Air escapes from the staterooms through ventilators in the baths or toilets. Exhaust fans are also connected to certain spaces, such as the galleys, public lavatories, and storerooms and workshops where required. Each stateroom on A and B decks is provided with an outlet for a portable electric heater, which may be used in times of unusual cold. Radiators are not installed in passenger's staterooms, the ventilating system making them unnecessary. Officer's and crew's quarters are heated by steam radiators; ventilation on the boat deck is natural, and below the boat deck in these quarters it is forced.

The air supplied to the dining saloon is put through a Carrier conditioning system which washes and dries the air and brings it to the desired temperature—warm or cool, according to the weather. This air conditioning system is here used for the first time on an American-built ship and the second time on any ship.

Fire Protection

Extensive protection against fire is provided on the *Mariposa*. Fire screen doors are fitted in strategic locations throughout the ship for the purpose of confining a fire, should one occur, to as small space as possible and prevent it from spreading from one deck to another. These are properly divided into two groups—fire screen or fire proof doors, fitted in corridors and at entrances to public rooms, and roller fire doors, fitted at stairways. No less than thirty fire screen doors are fitted throughout all parts of the passenger space. These doors, in many cases, are designed to harmonize

with the surrounding decorations, and are, therefore, difficult to recognize as being different from other doors. Several of them are even fitted with glass panels, a special type of glass approved by the fire insurance underwriters being used in these cases. Of the roller fire door type, fourteen are installed, in general at the landings on each deck at each main stairway. Normally, these doors are rolled up into casings in the tops of the door frames, and thus disappear entirely from view.

A fire main carrying water under pressure is fitted throughout the ship, with hydrants installed in a manner which permits all parts of the ship to be reached with a short length of hose. In all, ninety-two hydrants are fitted. Connections are made to the fire main for filling the swimming tanks.

Hand fire extinguishers of the chemical type are provided throughout all parts of the ship, sixty-two in number, of 2½ gallons capacity, made by the Buffalo Fire Appliance Corporation. Pyrene carbon-tetrachloride extinguishers are located in the space where it is intended to carry uncrated automobiles.

The Rich fire detecting system is installed in the cargo spaces, storerooms, and other parts of the ship as is now customary on ships of all types and sizes; and the Lux carbon dioxide fire extinguishing system is installed to cover boiler rooms, cargo holds, oil filling stations, paint lockers, lamp room, and storerooms. A Selex automatic electric fire alarm system is also installed, with thermostats in every stateroom on board the ship and in every other compartment not protected by the Rich fire detecting system. These thermostats give an alarm in the wheel house and in the engine room and engineer's lounge when the temperature of any space reaches a certain predetermined height, and also locate the source of the alarm. These three systems were furnished by Walter Kidde and Company.

In addition, a manually operated fire alarm system is installed, with twenty alarm boxes distributed throughout the accommodations and machinery spaces. Each of these registers an alarm by box number in the wheel house.

It will be noticed from the above descriptions that each fire detecting or alarm system instantly calls the attention of the officer on watch and gives him definite knowledge of the location of the fire or source of the alarm.

Steam smothering lines are fitted to all fuel oil tanks



The radio operator's desk featuring the 500-watt transmitting set installed by the Radiomarine Corporation of America.



An interesting view on the boat deck of the Steamship Mariposa featuring the Welin-MacLachlan type gravity davits. Note on the stacks, the unique hood designed by the technical staff of the Matson Navigation Company to assure raising smoke from the funnels away from the sport decks and the after end of the vessel.

and to the paint locker in the auxiliary machinery room.

Lifeboat Equipment

Lifeboats are carried on gravity davits of the Welin-McLachlan type. All boats and davits were supplied by the Welin Davit and Boat Corporation. The following boats are carried:

2	26-ft. motor boats, metallic	10 persons
14	30-ft. lifeboats, metallic	70 persons
4	26-ft. lifeboats, metallic	40 persons
2	20-ft. lifeboats, wooden	18 persons

The four 26-foot boats are nestled inside four 30-foot boats. Two sets of regular Welin quadrant davits, hand operated, are furnished for the 20-foot boats which are intended for use as workboats and are the only ones not carried on gravity type davits with electric hoisting gear. The motor lifeboats are provided with cabins and are fully equipped for service, each carrying a radio outfit as part of its regular equipment.

Mooring and Warping Equipment

Anchors are supplied to the Mariposa as follows: two bower anchors, 17,150 pounds each; one spare bower anchor, 14,595 pounds; and one stream anchor, 6,195 pounds. These anchors were made by the Baldt Anchor Chain and Forge Corporation.

Anchor cable, of National Malleable and Steel Casting Company make, consists of 165 fathoms of 3-1/8 inch stud-link chain for each of the two bower anchors; and 120 fathoms of 5 1/2-inch circumference steel wire streamline and 150 fathoms of 7 1/2-inch circumference steel wire tow line were furnished the ship by the Williamsport Wire Rope Company.

The windlass is of the horizontal spur geared type, made by the Bethlehem Shipbuilding Corporation, Ltd. Dual electric motor drive is provided, Westinghouse motors of 50 horsepower each at 600 revolutions per minute being used. The windlass and motors are mounted on the forecastle on one bedplate, the motors being water-tight.

On the forecastle also are two capstan heads, with the machinery on the deck below. Two more capstans are installed on D deck aft, capstans and motors in one unit on a common bedplate here. All these capstans are of American Engineering Company make and are driven by Westinghouse water-tight motors of 75 horse-

power each at 600 revolutions per minute.

Steering Gear

The steering gear is of the hydraulic ram type, having four single-end cylinders arranged fore and aft at a slight angle to conform to the shape of the hull. Two cylinders are aft and two forward of the tiller, to which they are connected by sliding blocks. The gear is actuated by electrically driven pumps, with two Westinghouse motors each rated at 75 horsepower at 400 revolutions per minute. The steering gear was made by the American Engineering Company. Emergency hand control is provided.

Commissary Equipment

The main galley on the Mariposa was laid out in accordance with the desires of the owners of the ship, who had found, through years of passenger transportation, that certain galley arrangements worked out to best advantage for them. Full advantage of their experience was taken to provide a galley which would be both convenient and economical, and which would provide, above all else, ample and efficient dining service to all passengers.

The galley is located on E deck, between the main dining saloon and the cabin dining saloon, food for both being prepared in the one main galley.

The arrangement of the galley is influenced by the fact that the boiler trunk divides the forward end of the galley. Entrance to the main dining saloon is had at the forward end of that trunk, by both stairs and elevator; and the doors between galley and saloon are necessarily located to port and starboard of the trunk. This facilitates a circular flow of waiter traffic and demands that the galley be laid out to conform.

The eight Westinghouse electric range sections are placed together to form one big range, with a hood above, in the central part of the galley. Adjacent are two Edison electric fry kettles of the latest automatic type. To one side are two Mitchell Woodbury charcoal broilers, and beside them a steam table and bain marie. Aft the ranges is a cook's table and a dumb waiter to the officers' mess room on the boat deck. Forward is a dresser, bain maries, and shelf space. Against the after end of the boiler trunk are a plate warmer and two "Thermotainers" or electric roll warmers, made by the Waters-Genter Company.



The main galley on the Mariposa, showing, above, steam tables and charcoal broilers and, below, a close-up of the Westinghouse electric ranges.

At the starboard side of the galley, the side from which waiters enter the main dining saloon, there are several pantries, arranged as follows: Nearest the main dining saloon is the coffee pantry, which contains Still urns for coffee and chocolate, Edison egg boilers of the electric automatic type, and a Lyons milk and cream dispenser, as well as lockers, food warmers, and the like; next a cold pantry, fitted with refrigerators, dressers, table, and sink, and with a Sunkist juice extractor, Hobart power driven bread slicer, and a hand ice crusher; then comes the bakery, containing two Westinghouse electric ovens, one of 3-deck, 40-loaf type and one of 3-deck, 60-loaf type, a proofing oven, a bread mixer, a Hobart food mixer, a steam-jacketed kettle, a trough for mixing dough, a confectioner's table, and an ice cream container, together with miscellaneous sinks, refrigerators, and shelves; the remainder of the starboard side forms a butcher shop, with appropriate tables, sinks, and dressers, and equipped with Hobart power-driven food chopping and meat slicing machines and a large refrigerator.

On the port side of the galley are pantries for glass and hollow ware, dishwashing, and silver washing. These are equipped with appropriate shelves, lockers, and dressers, and contain Crescent dishwashing machines and a silver buffer. A vegetable preparing room is on that side of the galley, and the outfit

here consists of two Hobart vegetable peelers, a Hobart mixer, an Emery-Thompson ice cream freezer of 40 quarts capacity, an ice crusher and crushed ice box, and sinks and tables. The steam kitchen is on this side of the galley, containing three steam-jacketed kettles, a steam roaster, and a Born vegetable steamer. Then there is a scullery for stowage of cooking utensils.

Just abaft the galley is the engine trunk; entrances to the cabin dining saloon are to port and starboard of this. In the remaining space to starboard is the cabin class pantry, fitted with Still urns, a cream and milk dispenser, Thermotainer, refrigerator, steam tables, griddles, bread slicing machine, juice extractor, and dressers; all similar in make and type to main galley equipment. To port of the engine hatch is a cabin class dishwashing pantry, with appropriate equipment, which enables dishes for cabin and first class saloons to be more easily kept separate.

Divisions within the main galley are made by combining light steel and wire mesh bulkheads, in which hinged panels are arranged to enable food to be distributed without requiring waiters to enter the pantries. Plate stowage is arranged in steel racks on the starboard side of the boiler casing and on shelves in other convenient locations.

On F deck aft there is installed a milk and cream making machine to convert milk in powdered form back to liquid. This machine was made by the Sharples Specialty Company from the owner's design.

In addition to the galley equipment noted above, deck pantries are fitted on A, B, C, and D decks to serve beverages, ices, and the like in staterooms and public



Above, the silverware pantry. Below, dishwashing pantry.

spaces. A pantry on the boat deck is arranged to serve meals in the officer's mess, the food being sent up from the main galley on a dumbwaiter. These deck pantries are completely equipped for the service intended. There is a crew's galley forward, completely equipped for serving food to the crew.

In the men's club room and the cabin smoking room, bars are provided; in the dance pavilion, a soda fountain.

The manufacture of equipment used in the preparation of food includes several concerns. Westinghouse and Edison-General Electric Appliance Company furnished most of the electrical equipment. Much galley machinery was obtained from the Dohrmann Hotel Supply Company of San Francisco; and steam tables, dressers, sinks, and other similar equipment came from the Mitchell-Woodbury division of the Jones McDuffee and Stratton Company. Soda fountain equipment was furnished by the United-American Soda Fountain Company.

The galley floor is of terrazzo and was laid by the Freeport Marble and Tile Company of Quincy. Tiling for the floor of the soda fountain was laid by the Rinaldi Company of Cambridge.

Laundry Equipment

The laundry is located on F deck amidships and contains the latest machinery for completely equipping a modern ship's laundry, all of which was obtained from the American Laundry Machinery Company. The machinery is electric, and is capable of washing, drying, and ironing the entire daily supply of ship's linen, and of taking care of passengers' laundry also. A tailor shop is also provided, and is supplied with irons and pressing machines and a Singer sewing machine for mending and pressing clothes of all kinds.

Mariposa carries a fully equipped hospital, divided into operating room, men's ward, and women's ward, each with two beds, and crew's hospital. Very complete equipment is provided for surgery and for care of illness of all kinds. A doctor's office is located aft, having entrances from both first and cabin-class accommodations. A waiting room is provided, and the doctor's stateroom adjoins. Hospital equipment was furnished by the Kny-Scheerer Company.

Plumbing Systems

Plumbing systems on Mariposa include hot and cold fresh water systems over the whole ship, a cold salt

water sanitary system, and a circulating ice water system.

Cold fresh water is stored in designated tanks in the double bottom and hold and is pumped from these tanks into the main system, which is kept constantly under pressure. Fresh water heaters are provided in the engine room, and the hot water circulates at all times through piping which takes it near all hot water faucets, enabling hot water to be obtained anywhere in a moment. The heaters are designed to keep the water at a temperature of 140 degrees Fahrenheit.

The sanitary system is supplied with cold salt water and is limited to flushing toilets, slop sinks, and the like. No salt water is supplied to passengers or crew for personal bathing purposes, fresh water only being supplied for that use. No connection is made between salt and fresh water systems.

The ice water circulating system maintains a supply of cold water to drinking fountains and drinking water supply taps in all parts of the ship. The ice water is pumped through two loops, one forward and one aft, from a chilled storage tank. Short leads are taken off from these loops to the different outlets in galleys, pantries, and mess rooms; and really cold water is thus obtained very quickly at any outlet. Fresh cold water, not iced, is also supplied from the drinking water tanks to galleys, pantries, and mess rooms for cooking purposes and drinking. All water for cooking and drinking is stored in tanks separate from other fresh water tanks. Washing water in staterooms and elsewhere is clearly labelled "Not for Drinking."

Mariposa is one of the first ships on which every first class room has a private toilet. In addition, the majority of first class rooms have a private bath or shower, or a bath for the use of either of two adjoining rooms. First class rooms on D deck are so arranged that a bath is convenient to each group of four rooms, being located at the end of, and entered from, the short passageway that serves those rooms, and being, therefore, of a semi-private nature. Every stateroom on the Mariposa is supplied with hot and cold running fresh water.

Cabin class rooms are well supplied with toilet facilities; though private baths are not fitted here, public lavatories and baths are ample in number and size, and are well appointed.

In plumbing, sanitary systems, and fresh and drink-



Probably no ship on the Pacific is better equipped than the Steamship Mariposa for the comfort and well being of officers and crew. These two views show the officers' mess and the captain's office.

ing water supplies, the *Mariposa* equals the best new hotels; and the traveler who is used to every modern facility should find no difficulty in being comfortable on board.

Plumbing fixtures throughout the ship were supplied by the Noland Company of Newport News and were made by the Standard Sanitary Manufacturing Company, the single exception being that Sloan flush valves are used throughout. A new type of faucet is used which is self closing but which can be regulated to close very slowly, thus having the convenience of a steady running faucet combined with the necessity on shipboard of a faucet which does not waste water by being left open accidentally or for long periods. These faucets, made by the Standard Sanitary Manufacturing Company, also eliminate all water hammer and the disagreeable noises incident thereto.

Passenger Accommodations

A feature of *Mariposa* which at once attracts the attention of the passenger is the excellence of the accommodations. Staterooms are large and are very complete in appointments; and every detail making for the comfort and happiness of the passenger has been carefully looked after.

A visitor to the ship who has the privilege of inspecting both first and cabin class accommodations notes with surprise that the fittings and decorations of rooms of the two classes are practically identical. This seeming coincidence enables the ship to be used as a one class ship if desired simply by leaving open the doors which are ordinarily closed to form the divisions between classes.

Beds, made of steel in imitation of bamboo, are provided in all rooms throughout first and cabin classes. Each stateroom has a bureau with exceptionally large drawer and sliding shelf space. Large wardrobes are fitted in every room, which are unique in that each is long enough to hold the full length of a woman's dress clear of the bottom of the wardrobe. Light but strong wicker chairs are used in all rooms. Running hot and cold water is provided in every room, and ice water is contained in large thermos pitchers. Every room in both classes also has a telephone. On the side of each bureau is a convenience outlet on the 115-volt system which may be used for electrical appliances, such as curling irons and fans, as desired by the passenger.

The first-class rooms have beds only—no upper berths—and are arranged for one and two persons; 57 rooms are single, and 209 double. Double rooms are mostly equipped with twin beds, though care was taken to install double beds in several. Many of these rooms are arranged to be used as suites, doors between adjacent rooms being provided. Some combinations are worked out whereby rooms may be combined in suites of either two, three, or four rooms, in some cases with parlors in addition, or may be used as single rooms, as may be desired on occasion. Trunk rooms are provided with some of these suites. Each first class stateroom is furnished a folding card table, stowed in a rack beneath the bed.

Cabin-class rooms have been arranged for two, three, and four persons; 3 for two persons, 33 for three persons, and 31 for four persons. Beds are provided in all of these rooms, and one or two upper berths as required. These upper berths were especially designed for *Mariposa* and her sister ships. They are of the folding type, with a double hinged arrangement which permits each to fold up into a shallow built-in box high up in

the room, leaving almost full headroom over the beds. The rooms thus appear to have no upper berths at all, which greatly augments their apparent size compared to the usual three- and four-berth rooms.

Beds and berths, supplied through Hopeman Brothers, are of Simmons manufacture and are equipped with Simmons Coil Springs and the famous Simmons spring filled "Beautyrest" mattresses.

Two passenger elevators are provided, one running from the boat deck to E deck inclusive, the other from A deck to F deck inclusive. An engineers' elevator is also installed, running from the boat deck to F deck inclusive, in way of the engineers' quarters; a crew's or ship's stores elevator, from A to F decks; and two baggage elevators, between E and F decks only. The dumbwaiter between officers' mess and galley is also electrically operated. All were supplied by the Otis Elevator Company.

A fully equipped barber shop is provided for the use of first-class passengers; and a ladies' beauty parlor of equal quality. In the cabin-class an additional barber shop and another beauty parlor are provided for cabin passengers and also a barber shop for the crew. All barber shop equipment was supplied by T. O. Kocks Company.

On D deck in the forward foyer is an attractive novelty shop, a necessary feature of the modern passenger liner.

The central telephone control is located on E deck, off the forward foyer. Adjacent is the chief steward's office, the purser's office for first-class passengers, and the freight clerk's office. The cabin-class purser's office is aft, on D deck.

A broadcasting system is installed which distributes entertainments or lectures given on shipboard as well as radio programs from shore picked up by the ship's receiving set. Provision is made for microphones to be installed in the main lounge and dance pavilion and at the captain's table in the main dining saloon; loud speakers are installed in all public spaces, on deck, and in private verandas and parlors of suites for use when desired by the passenger.

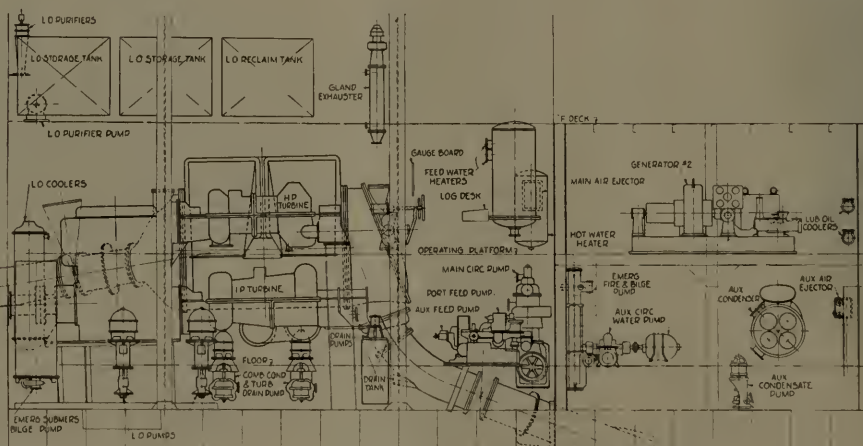
Two duplex talking picture systems have been provided for the entertainment of the passengers. One is installed in the main lounge; the other in the cabin lounge. These radio and talking picture installations were made by the R.C.A.-Victor Company and the R.C.A.-Photophone Company.

A photographic dark room is provided on board in charge of a photographer so that passengers who are photographers may have their films developed "en voyage."

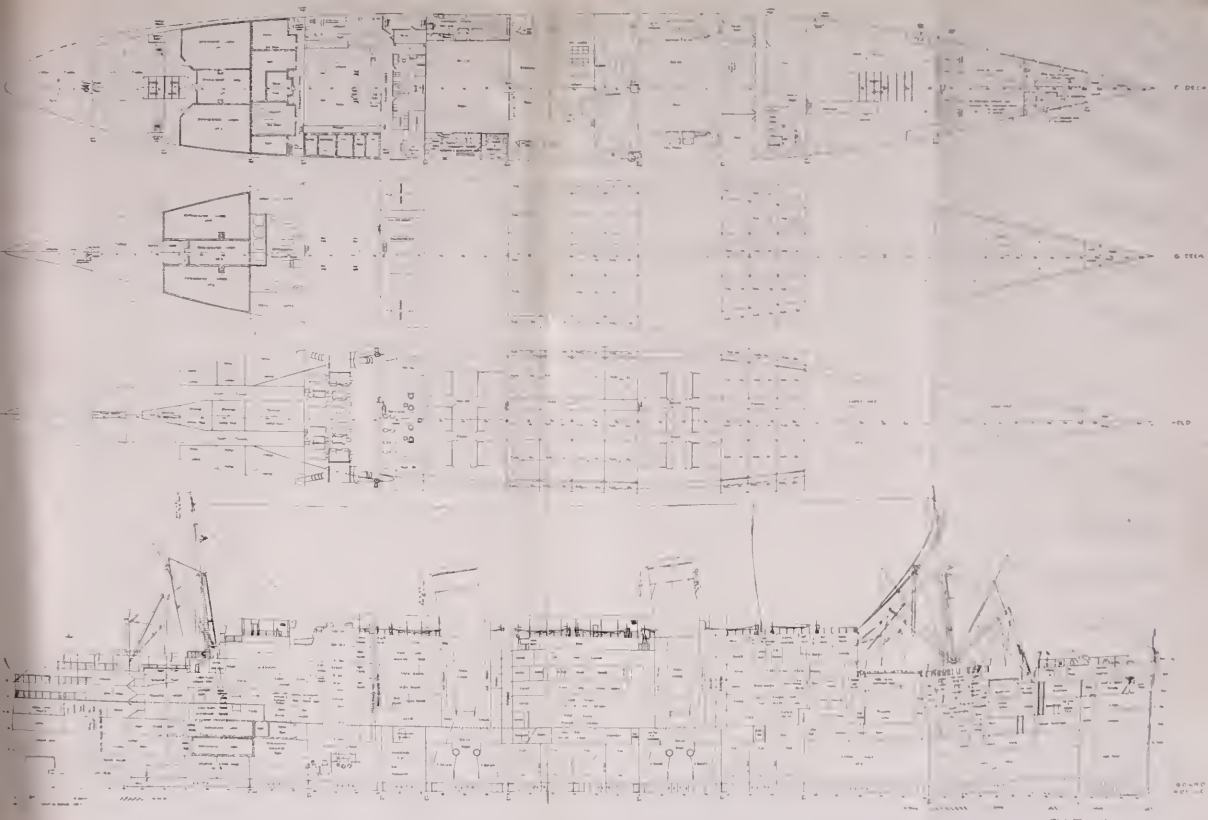
Deck covering throughout all passenger space, in public rooms, staterooms, and corridors, and on stairways, is rubber tile, all supplied by the United States Rubber Company. Carpets and rugs are used in staterooms, foyers, public rooms, and elsewhere as found appropriate.

A gymnasium for the benefit of passengers is provided on the boat deck. It is equipped with the best of outfit, which includes weights, rowing machines, medicine balls, boxing gloves, punching bags, a mechanical horse, and other outfit intended to inspire pleasant exercise. All gymnasium outfit was furnished by A. G. Spalding and Brothers.

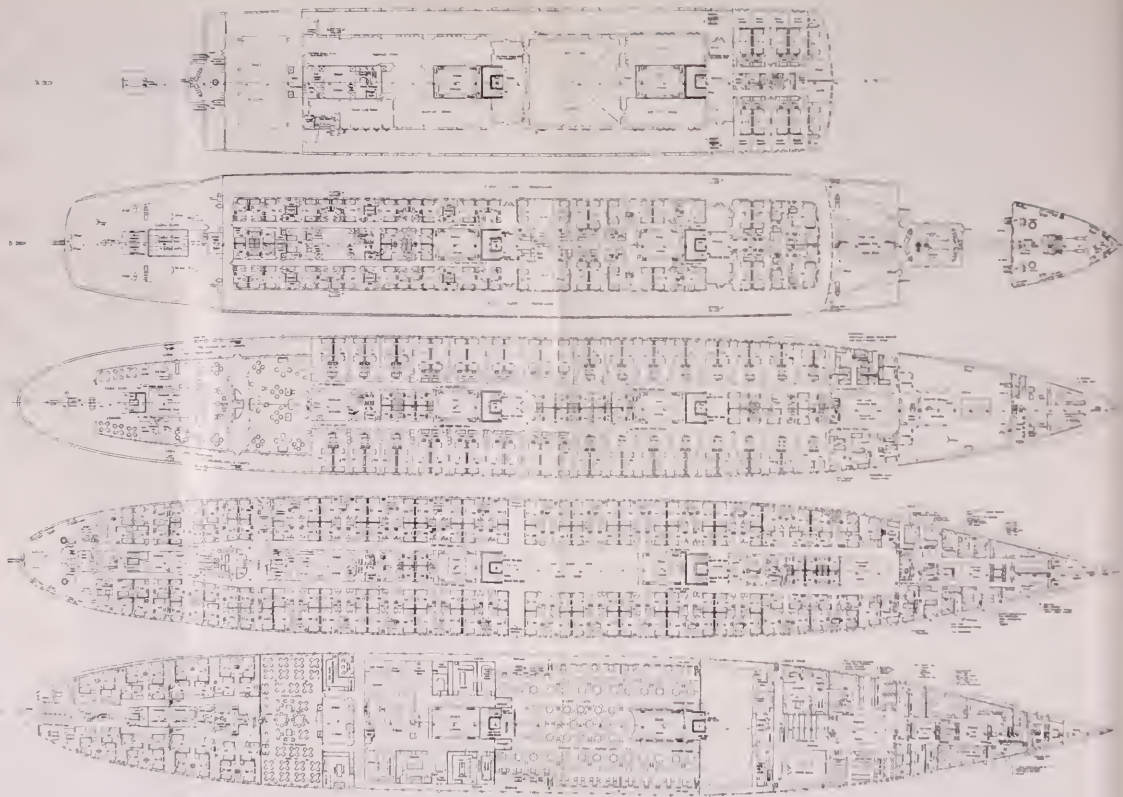
Adjacent to the gymnasium is an electric bath, which might be described as a modernized turkish bath especially suited to use in the tropics.



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Plans of F deck, G deck, and Hold; and Inboard profile of S. S. Mariposa



General Arrangement Plans of the Passenger Decks, S. S. Mariposa

Mariposa

Interior Decoration

*Strikes a New Note for the American Merchant
Marine in Architecture, Color, and
Furnishings*

THE interior decoration of Mariposa is the work of Warren and Wetmore, architects, of New York City. Joiner work was done by Hopeman Brothers, of Rochester, New York, who worked in conjunction with Warren and Wetmore to produce furnishings of a style appropriate to the service in which the Mariposa is to be used. With service in the tropics in mind, the decorators selected soft, cool colors for the interiors; and the oriental and Chinese Chippendale effects used are reminiscent of the South Seas and islands therein to which the ship is designed to sail.

Mariposa strikes a new note in architecture, color, and furnishings. The keynote of design is simplicity; and beauty is obtained without ornate and elaborate decorations. Heaviness of style has been carefully avoided; the opposite extreme is the rule. Furniture throughout the ship is light in appearance, and therefore cool in effect. Rattan and cane are much used, finished both naturally and in vivid contrasting colors. It is especially notable that heavy appearing hardwood is entirely eliminated from the decorations in the first class quarters, appearing only in the curly mahogany bar counter in the men's club room. Drapes and curtains are entirely omitted in the first class; carved wood grilles in soft tones are substituted for them at windows in public rooms. Mariposa is, in fact, the first passenger ship afloat which has not a single curtain or drapery in any first class stateroom or public room, excepting the rather necessary stage curtain in the main lounge. The effect of the interior decoration as a whole has been so studied and developed that this omission is an appropriate and pleasant departure from the ordinary.

The general color scheme is soft, pale tints of gray, green, and blue.

Corridors, foyers, and stairways are free from heavy moldings and pilasters. Corridor walls and ceilings are generally finished in pale French gray, and floors are covered with blue and light gray rubber tile. Stateroom doors in corridors are given a coat of dull silver, and door frames are painted pale blue. Foyers are similarly finished in grayish green with gray and green rubber tile floors.

The staterooms are finished, in most cases, with cool grayish green, with touches of bright coloring in the rattan chairs and the shades for the bed and dresser lights. The specially designed dressers are painted green to harmonize with the walls and are decorated



A decorative motif in the lounge.

by dainty painted garlands of small flowers. Beds are of metal, of the appearance of bamboo, and were designed especially for the ship.

Furniture in the four special suites de luxe is, to some extent, of the Chinese Chippendale style.

First Class Public Rooms

The first-class lounge is a room of unusual beauty and attractiveness. It is about fifty feet square and fifteen feet high. The decoration is a rather broad adaption of Chinese Chippendale, with mural decorations from floor to ceiling consisting of quaint oriental figures and foliage in the style of Pillement, painted in soft coral tones on a background grading smoothly from golden yellow at the bottom to deep turquoise blue at the top. The windows are screened with carved wood grilles, which are finished in antiqued gold leaf. All windows and doors have canopies of carved wood in gold and turquoise with valences of Philippine "Kapa" shell—a translucent, faintly colored sea shell. The lighting is derived from four large indirect fixtures arranged on four slender, clustered columns in the room. These fixtures are in the form of inverted flaring bells of "Kapa" shell and gilded bronze, the shell being graded from soft yellow at the bottom to turquoise blue at the top, giving a very pleasant combination of direct and indirect lighting. The ceiling is smooth flat white, without beams, and is especially appropriate for indirect lighting. Above each window and forming part of the window treatment is a rosette of "Kapa" shell, with reflector lights behind, which adds a soft, opalescent light to that from the four main fixtures. The furniture here is principally rattan, with gray colored binding and deep, comfortable cushions in shades of blue, green, and gold. A large table in the center is flanked on each side by an inviting sofa, and carries a lamp in the form of a magnificent, tall Chinese vase with large silk shade. The floor is covered with rubber tile in a basket pattern of soft blue and green. The curtain for the stage is made of shimmering, silver-green transparent fabric over a backing of gold



A Few of Mariposa's Public Rooms

Above, the first class lounge, a spacious apartment, fifty feet square with a 15-foot ceiling; furnished and decorated in Chinese Chippendale. At right, the deck ball room, or dance pavilion, is a combination of verandah cafe and night club. The walls, finished in a green material to give the appearance of marble, are overlaid with wooden latticework. Kearfott windows, port, starboard, and aft, afford ample ventilation and a fine sea view.



At the left, smoking room is wainscoted and beamed in chestnut. The sides of the well in the ceiling are decorated with panels of under-sea life in the Japanese style. The rubber tile flooring in all of these rooms is furnished by the United States Rubber Company.

DINING SALOON



Finished in dull silver, with trimmings in delicate green, and ornamented with brilliantly colored bird panels, the first class dining saloon seats 374 at small tables. The clearstory in the center is decorated with oil-painted panels representing all types of sailing ships. The chairs in this room are of aluminum finished in dull green with upholstery of the same color.

satin and blends perfectly with the general decorative scheme of the room. In each corner is a large cactus plant, with long, thin, delicate branches.

The writing room is decorated with charts and mural paintings depicting the Pacific Ocean and the ports of call from San Francisco to Australia. The charts are in old parchment color and the murals in soft pastel shades. The panel mouldings framing the murals, the low wood dado, and the cornice and ceiling are all painted soft old ivory color. Desks are painted a soft dull yellow; the chairs revolve on fixed bases, and are painted to match the desks, having upholstered seats of green, coral, and silver brocade. Each desk has a desk lamp of rock crystal in Chinese pattern; and flat, crystal ceiling fixtures light the main body of the room. Windows are screened with wood grilles in Sheraton design.

The library is finished in knotty pine, both walls and ceiling, in early American style. Wood grilles are fitted at the windows here also, and here continue the effect of the wainscotted walls. Book cases are fitted from floor to ceiling at each end of the room. On the wall on the long side of the room are hung rare old prints of ships of the eighteenth and nineteenth centuries. Drum tables are used in this room, and deep, comfortable arm chairs upholstered in blue morocco. The floor is of deep blue rubber tile, with a thick pile blue carpet runner extending the length of the room. A glass cornice extends entirely around the room, concealing lights, and giving a soft, pleasant illumination well distributed over the whole room.

In the smoking room, the walls are wainscotted from floor to ceiling in chestnut stained grayish, with the grain clearly showing. The ceiling is divided into panels by shallow beams of chestnut and is painted grayish blue. In the center of the room is a well in the ceiling, the sides of which are decorated with panels of under-sea life in misty tones, somewhat in the Japanese style. Gray oak is used for the furniture. Table chairs have cane seats and backs, and arm chairs are upholstered in blue leather. The floor is of pinkish gray rubber tile that harmonizes with the walls. Carved wood grilles are fitted at the windows. The walls are decorated with

a number of rare prints of old English hunting scenes.

Off the smoking room is the men's club room—a "sanctum sanctorum" for men only, as its name implies. It is finished in Oregon cedar toned down to a soft reddish brown with the natural grain of the wood showing. In one corner is located the bar, behind which is featured a magnificently carved illuminated panel showing Neptune and a mermaid drinking toasts to each other, while angel fish, sea horses, and a sea serpent look on. The furniture is similar to that in the smoking room, and carved wood grilles are provided at the windows in place of curtains.

A dance pavilion completes the list of public rooms on "A" deck, and is a combination of veranda cafe and night club. The room is decorated in the manner of a palm court or covered garden. The walls are of a pale green material of the appearance of stone or marble, and are overlaid with wooden lattice work. Trim is in green, gold, and Chinese red. Living palm trees are used in the decorative scheme. Windows aft and on each side afford light, plenty of fresh air in warm weather, and a fine sea view, and large doors open on a deck aft which forms a quiet open veranda. The center of the room is left clear of furniture, and an excellent maple floor furnishes dancing space for many couples. A central revolving mirror sphere is attached to the ceiling over the center of the dancing space and on it four spot lights with revolving color wheels throw vari-colored lights which are reflected in a shower of lights over the dancing space. The main lights of the room can be dimmed to suit. Outside the dance floor, small tables are placed; and the floor is covered with rubber tile which simulates Travertine marble.

The foyers on "A" deck are furnished with handsome rugs, appropriate furniture of Chippendale design in ebony with champagne colored leather upholstery, console tables, mirrors, and paintings. One of the paintings is the work of the famous marine artist M. Dawson, and depicts a brig in full sail on a rough sunny sea.

The first-class dining saloon is a room of unusual appearance and novel decoration. It is finished in dull silver relieved by delicate moldings in green. Each



The library is a charming room finished in knotty pine wainscotted walls and ceiling. The inboard wall is hung with rare old prints of ships. The floor is deep blue rubber tile with a heavy pile blue carpet runner. An interesting feature is the illuminating glass cornice that furnishes the general lighting for the room.

First Class Staterooms



Upper row, a stateroom of a de luxe suite and a typical first class stateroom. Middle row, sitting room of a suite and a stateroom with private veranda (lanai). Lower row, a private veranda, the bed room and sitting room of a suite.



The public rooms of the cabin class on the Steamship Mariposa are equal in beauty and furnishings to the first class accommodations on many a fine passenger liner. Our illustrations show, at the top, a portion of the cabin class lounge; in the center, a corner of the cabin class smoking room; and, below, part of the cabin class dining room.

wall panel is decorated by a gay bird in bright plumage, and all together form a border of brilliant color around the room. Windows are of leaded "Kapa" shell illuminated artificially from behind, and the light from them is soft and iridescent. In the center of the room is a clearstory of a full additional deck in height; the walls

of this form a marine panorama with ships of all kinds from early Viking types to clipper ships, including a variety of South Sea sailing craft; with a background of misty headlands suitable to the types of ships. Slender pillars add to the apparent height of this clear-story and divide the mural into panels. Illumination is by indirect flood lights. Dining room chairs are made of aluminum, and are finished in dull green with plain upholstery of the same color. The floor is of rubber tile in varying shades of green, and the ceiling is very soft coral pink in diamond shaped panels, with small lights set close to the ceiling and protected by shades of crystal in a pineapple pattern which spread the light without glare.

The interior decoration and furnishing of Mariposa is without doubt a distinct departure from the conventional style of steamship decoration. Period rooms are entirely lacking, and heavy hardwood finish has given way to painted walls; and draperies and window curtains to wooden grilles in the public rooms.

Cabin-Class Rooms

In the cabin-class accommodations, the staterooms, foyers, and corridors are decorated in a manner very similar to corresponding first-class spaces. The walls and furniture are painted similarly to walls and furniture of the first-class; and here also, coolness, comfort, and simplicity are the keynotes of the decorative schemes.

In the cabin-class, the style of decoration is more conventional, but wicker and light appearing furniture is still retained to a large extent, and the upholstery provides the bright color necessary to relieve the plain paint generally used on the walls. Gay tapestry curtains are used in the windows here. The paint on the walls in staterooms and public spaces is generally ivory and dull green. Fancy decorations are omitted in favor of refined simplicity.

The dining saloon is an especially attractive room, finished in dull green with bright colored curtains at the air ports. The lounge is finished in dull ivory, and the smoking room in small panels of dark oak with large upholstered chairs and oak tables inviting quiet comfort. Both smoking room and lounge have fireplaces with electric logs which add materially to the sense of comfort found in these rooms.

Floors throughout are covered with rubber tile in colors to harmonize with the decorations. Mirrors and pictures are extensively used in appropriate locations.

All has been arranged with greatest consideration for the comfort of the passenger; and cabin-class accommodations on the Mariposa are in truth the equal of the first-class on many passenger ships of the most modern type; in them, the desired effect of comfort has been admirably achieved.

Lighting Fixtures

Not a little of the charm of the passenger accommodations aboard the Steamship Mariposa comes from the diffusion of light, the absence of glare due to the use of opalescent Lenox porcelain globes for the ceiling fixtures. The merit of this material for this use was first recognized by the American merchant marine through its general use in specially designed lighting fixtures on the Matson liner Malolo.

Mariposa

Machinery Installation

*A Modern Single-Reduction-Geared Steam-Turbine
Propulsion Plant with Electric Auxiliaries*

THE machinery of Mariposa consists of high pressure, high temperature, water-tube boilers, single reduction geared turbines and electric auxiliaries, in accordance with the most modern practice for reliability and economy. It is a twin-screw installation, designed to deliver 22,000 total shaft horsepower at 124 revolutions per minute of the propellers in normal operation.

The boiler plant consists of twelve units in two fire rooms, arranged for forced draft with closed stoke hold. The boilers are of the Babcock & Wilcox cross-drum marine type, fitted with interdeck superheaters, tubular air heaters, soot blowers, feed regulators, and smoke indicators. Each boiler is fitted with four Cuyama oil burners. The total water heating surface is 53,520 square feet; the total superheating surface is 5352 square feet; the total air heating surface is 32,112 square feet. The four centerline boilers are fitted with desuperheaters in the steam drum, having a total surface of 180 square feet. The designed steam conditions at the superheated outlet are 375 pounds (gauge) and 650 degrees Fahrenheit total temperature.

Air for combustion is provided by eight motor-driven fans, four in each fire room, of which two are spares. These fans draw the air through suction ducts leading from the exposed deck and discharge it into the fire-room. The air in the fire room enters the air heaters at the front of the boiler and passes through air casings around and under the boiler, and through a double front, to the oil burners. There are two double stacks, each serving six boilers.

In each fire room there are two fuel oil service pumps, one of which is spare, a fuel oil transfer pump, and emergency fuel oil service pump, and two fuel oil heaters, one of which is spare. There is also a complete installation of fuel oil strainers, fuel oil meters, carbon dioxide indicators, gas and air temperature thermometers, and gauges.

The propellers are of solid manganese bronze, 18 feet in diameter and 19 feet 6 inches pitch, each having three blades; the blade sections are of stream-line shape. The developed area is 105.8 square feet; the projected area, 88.7 square feet. These wheels were cast by the Cramp Brass & Iron Foundries Co. of Philadelphia.

Each set of turbines consists of three units of Bethlehem-Parsons turbines in series, arranged in separate casings around a single gear wheel. The high pressure unit is an impulse-reaction turbine with dummy piston just forward of the impulse wheel. The intermediate pressure unit is a straight reaction with dummy piston at the aft end. The low pressure unit is a double-flow straight reaction turbine. The astern unit located in the forward end of the low pressure casing, consists of two impulse stages, with three rows of rotor buckets in the first stage and two rows of rotor buckets in the second stage. All ahead turbines have rotors of drum construction.



An interesting feature of the Steamship Mariposa is this passage for piping between the two fire rooms. Note Pneumercator gauges on the bulkhead.

The steam conditions at the turbine throttle valve are 360 pounds (gauge) and 650 degrees Fahrenheit total temperature. The vacuum at the low pressure turbine exhaust flange is 28.5 inches.

There are 29 nozzles in the lower half of the high pressure chest, 15 of which are under control of the turbine throttle valve and the remainder in three groups of 2, 4, and 8 nozzles, respectively, controlled by hand valves.

Overspeed governors are provided which function as follows: An impeller on the forward end of the high pressure turbine shaft discharges lubricating oil to an adjustable spring-loaded valve which serves to actuate a pilot valve, which in turn controls the flow of oil (under lubricating oil pump discharge pressure) to and from an operating cylinder closing the main ahead throttle valve.

The single reduction gearing is of the double helical type, manufactured by the Falk Corporation, and the main proportions are as follows: Pitch diameter, gear wheel, 156 inches; pitch diameter, pinions, 12.25 inches; and net face, 56 inches.

The propeller thrust is taken by a 34 inch nominal diameter double-horizontal, self-aligning, equalizing, six-shoe Kingsbury thrust bearing, incorporated in the forward end of the gear casing. Three-shoe bearings of the same type, with a nominal diameter of 13½ inches are fitted on the forward end of each turbine shaft.

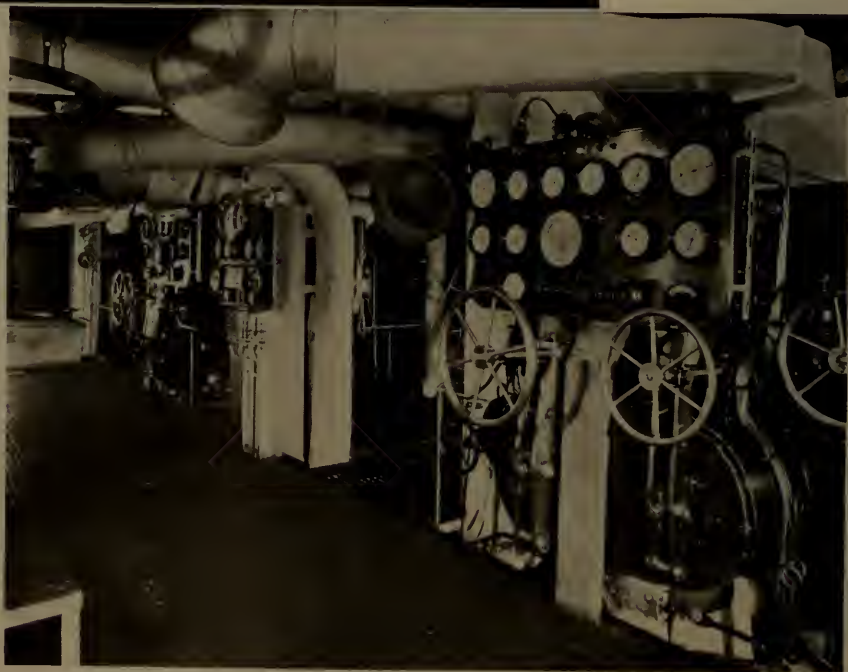
Located outboard of the low pressure turbines and connected thereto by double exhaust trunks are two Bethlehem main condensers of the single pass type, each with a cooling surface of 13,562 square feet. These condensers are served by injection scoops. For maneuvering and stand-by conditions, vertical turbine-driven propeller type circulating pumps are provided, one for each main condenser.

Each condenser is provided with a twin-stage air ejector mounted on a combined inter- and after-condenser. Each two-stage unit has sufficient capacity to remove the air from the condenser it serves when the unit is developing maximum power. The other set is used as a stand-by.

An Economical Marine Power Plant



One of the fire rooms of the Steamship Mariposa showing the furnace fronts of the Babcock & Wilcox interdeck, superheater type marine water-tube boilers.



The control stand in the engine room of the Steamship Mariposa takes care of 22,000 normal horsepower in two triple expansion Bethlehem steam turbines.



The dynamo flat on the Steamship Mariposa supports four Westinghouse 500-horsepower geared turbo-generators. The total collected power load is 2600 kilowatts and the total lighting load 230 kilowatts. There are 46 electric stations for distribution of current for power and lighting.

Two vertical motor-driven centrifugal main condensate pumps are provided for each unit, one being a stand-by pump. On the end of the condensate pump shaft, and contained in the same casing, there is provided a turbine drain pump.

Auxiliary Power

There are four Westinghouse 500-kilowatt, 240/120-volt, direct-current, geared turbo-generators, 6000-1200 revolutions per minute, with external balance coils; each generator is capable of 25 per cent. overload. The turbines are of the high-speed, high-efficiency type. The turbines of the two inner generators are arranged for emergency atmospheric exhaust.

There are two 3400-square foot Bethlehem two-pass straight tube condensers serving the four turbo-generators. One 10-inch horizontal single stage centrifugal circulating pump is provided for each condenser. There is a twin two-stage air ejector mounted on a combined inter- and after-condenser for each condenser. One two stage unit is sufficiently large to remove the air from the condenser it serves at maximum power, the other being a stand-by. All air ejector inter- and after-condensers are cooled by condensate only. A recirculating connection is provided from the discharge side of the air ejector condenser to the condenser unit it

serves, to provide sufficient cooling water under emergency conditions.

All auxiliary turbines take steam at full boiler pressure and full temperature, and exhaust against a back pressure of 10 pounds, with the exception of the turbo-generators which exhaust into a condenser at 28.5 inches vacuum.

The emergency steam-driven reciprocating pumps take steam at full pressure, which has passed through the desuperheaters in the four center-line boilers.

All motor-driven auxiliaries are equipped with Westinghouse motors and control equipment.

The evaporating plant consists of two Davis "Parcoil" evaporators with automatic feed regulators, two Davis "Parcoil" distillers and the necessary inter-connecting piping. It is normally used for pre-evaporating raw fresh water for make-up feed pump supply. Under these conditions operating steam is taken from the high pressure bleeder line and the made vapor is discharged to the low pressure bleeder line.

Connections are provided to permit making fresh water from salt water. Under these conditions the vapor is condensed in the distillers and the water is then discharged to the various fresh water tanks.

Provision is made for taking operating steam from a

The emergency generating set consists of a 30-kilowatt 115-volt Westinghouse generator driven by an Atlas-Imperial diesel engine. Through the door in the background may be seen the battery room and part of the 60-cell, 310-ampere-hour Exide storage battery.



reduced pressure steam line, instead of from the high pressure bleeder, for port and emergency operation. The cycle used provides pre-evaporated make-up feed or evaporated fresh water at a minimum cost in fuel. A hand-controlled orifice connection is provided that will recirculate feed through the dynamo condensers under emergency operating conditions, in order to prevent steaming in the feed tank.

Condensation is removed from fresh-water heaters, fuel oil heaters, fuel oil tank coils, and whistle lines with Chevalier Drainators. The operating principle of the Drainator eliminates the use of moving parts, a fundamental departure from other steam trap design.

A McNab salinity indicating system is installed, test lines being fitted at various points where salt water pollution may take place. One Short alarm service tank is located in each fire room which separates oil out of polluted steam drains from fuel oil heaters and fuel oil tank heating coils. An electric alarm bell system notifies the operator when oil has collected in the Short tank.

Refrigerating Machinery

There is a Brunswick-Kroeschell refrigerating plant for cooling cargo and ship's stores and for conditioning the air in the dining saloon. The refrigeration is divided into three separate systems, which permits cooling the cargo with either high or low temperature brine, as follows:

First, low temperature brine system to operate on the following under all conditions:

- Pantry boxes, located on main and upper decks;
- Ice cream freezer, located on E deck;
- Ice-making set, located on F deck;
- Scuttle-butt, located in brine return tank room;
- Ship's stores, located on E and F decks.

Second, low temperature brine system to operate on any or all main cargo spaces on F and G decks when these boxes are loaded with cargo requiring temperatures at or below freezing.

Third, high temperature brine system to operate on any or all main cargo spaces on F and G decks when these boxes are loaded with cargo requiring temperatures above freezing.

The compartments mentioned in the second and third systems above are also equipped with air coolers, ducts, fans, and dampers.

* The compressors, evaporators, and pumps are so interconnected as to permit great flexibility of operation. The two-temperature brine system permits operating at high and low back-pressures simultaneously, thereby greatly increasing the efficiency of the plant and reducing the horsepower consumption per ton of refrigeration.

In order to keep a close check on the temperature of the various cold storage compartments there is provided a system of Brown distant reading electric thermometers with an indicator in the brine distribution room.

The air-conditioning system is a direct-expansion system operating on an air conditioner located on F deck for cooling and conditioning air for the main cabin dining saloon. This system utilizes one compressor and one condenser of the cargo refrigerating plant.

There are also two "B-K Jr." model J-34 refrigerating units installed in the crews' galley and cabin class bar.

Switchboard and Electric Circuits

The main switchboard consists of 10 panels and is about 22 feet long. The power bus is 230-volts and the

lighting bus 230/115 volts with a grounded neutral. All circuit breakers providing power to auxiliaries have the time-delay feature, and breakers supplying the galleys have under-voltage trips.

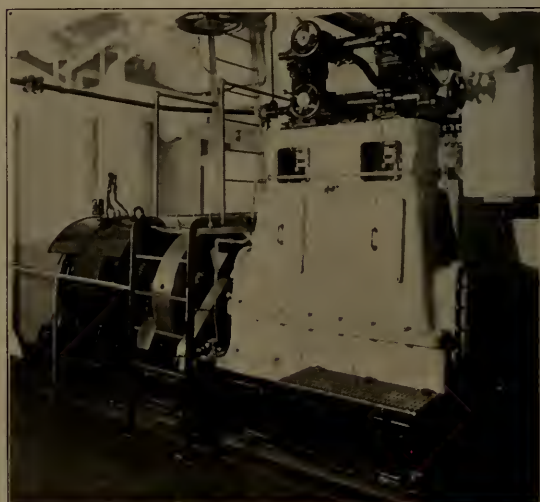
There are a total of 46 electric stations throughout the boat for distribution of power and lighting. Some are for power, some are for lighting, and some are for both. Power feeders for these stations are run direct from the main switchboard. Duplicate 3-wire lighting feeders, for all but machinery compartments, are run direct from the forward and aft lighting distribution boards, one half the load connected to each feeder. The lighting for the various machinery compartments is fed direct from the main switchboard to individual panels in each compartment.

The total connected power load is 2600 kilowatts and the total lighting load is 230 kilowatts.

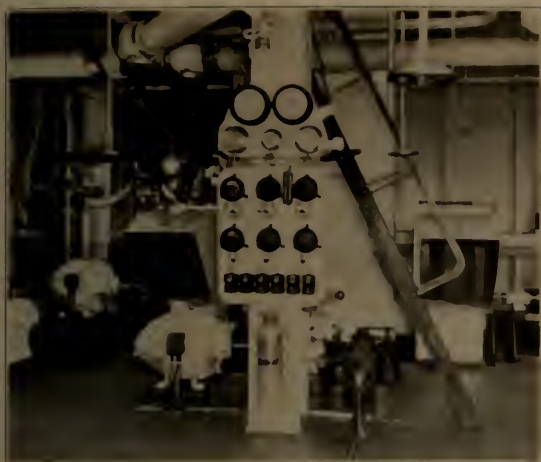
The emergency power and lighting plant consists of a 30-kilowatt, 115-volt, direct-current diesel engine-driven generating set with an Atlas-Imperial diesel engine and a Westinghouse generator and a 60-cell 310 ampere-hour storage battery. If the main generating plant fails, the emergency lights are automatically switched over to the storage battery, which has power available to supply the radio equipment and emergency lights for a period of about two hours, or until the emergency generator is on the line.

The supply for the various 115-volt interior communication systems is from the emergency bus; for ship's telephone system and miscellaneous interior communication system, from 3-115 ampere-hour storage batteries. The passengers' telephone system has its own storage batteries and charging motor generator.

The lighting installation for the passengers' quarters was worked out in conjunction with the interior decorators, Warren and Wetmore, and with Hopeman Bros., who had charge of all interior woodwork. All of the decorative fixtures were manufactured from special designs made by the architects to suit the various decorative schemes. X-ray reflectors were used for all indirect lighting. There are 4250 lighting fixtures containing a total of 6600 lamps, varying in size from 10 watts to 1000 watts. Of special interest is the decorative



One of the four Brunswick-Kroeschell compressors of the Mariposa's refrigerating plant.



Close-up of the blower arrangement and the fuel oil service pump at one side of one of the firerooms of the Steamship Mariposa.

lighting scheme for the dance pavilion. All lighting is controlled from the musicians' platform, and, in addition to the regular lighting, there are four spot lights with motor-driven revolving color lenses which illuminate a revolving crystal, creating a novel effect comparable with the most modern night club.

Fourteen 100-watt flood lights have been provided for illuminating the side of the ship when launching lifeboats. These lights, together with all outside lighting on the top side and such other lighting as may interfere with the navigation of the ship, are controlled from the lighting distribution panel in the wheel house.

One hundred and ninety 12-inch bracket fans are provided for public spaces, crew's quarters and various offices.

All motors are designed for 110 per cent. continuous rating in order to operate satisfactorily in the tropics. There are 235 electric motors ranging in size from $\frac{1}{4}$ horsepower to 75 horsepower, with an aggregate output of 2500 horsepower.

Wherever possible open-type control equipment has been used and this has been assembled on special panels to form group control switchboards at the various electric stations. All control equipment is semi-automatic with remote control pushbuttons at the motors. On all vital auxiliaries in the machinery spaces indicator lights have been provided over the gauge boards to show the operation of the auxiliary.

There are twenty water-tight sliding doors below the bulkhead deck, electrically operated by the Cutler-Hammer system which consists of motors and control equipment at each door and master controls in the wheel house. Provision is made to open or close these doors either singly or all at once from the master control. Mechanical control is also provided at each door from stations above the bulkhead deck. An electrical indicating system shows the position of each door, at each mechanical control station. Safety gates which close before the main door operates are provided in all passages through which passengers may pass.

Two separate systems of collision and alarm bells are provided, one for officers and crew and the other for passengers' quarters.

There are two Henschel telephone systems, one for use in navigating the ship with telephones located in

the wheel house, engine room, steering engine room, crow's nest, forecastle deck, and aft docking station; the other for the use of the engineering force, with telephones located in the engine room, chief engineers' stateroom, chief engineer's office, and each fire room.

There is also provided a complete telephone system for the use of the passengers and ship's personnel. This is a standard American Telephone and Telegraph Company installation, consisting of a 400-line, one-position switchboard and telephones in each passenger's and officer's stateroom. The telephones in passengers' staterooms are French or cradle type. All offices, operating stations, and all electric stations are connected to this switchboard also. Shore connections are provided to enable calls to be put through the local exchange while the ship is docked.

A system of call bells is provided for the convenience of passengers on the promenade deck, in all public spaces, and public baths and toilets, with annunciators in the various deck pantries. Call bells are also installed in each cold storage compartment with an annunciator in the steward's stores.

Miscellaneous signal and alarm devices for the use of the engineering forces are provided as follows:

Fuel oil filling signals with bulbs and pushbuttons at all filling manifolds and transfer pumps.

Lubricating oil low level alarm.

Feed tank low level alarm.

Various voice tubes for communication.

List of Auxiliary Equipment

No.	Item	Type	Maker
2	Main circulating pumps	Vertical, single stage centrifugal turbine drive.	Pump—Warren Turbine-Sturtevant
2	Dynamo circulating pumps	Horizontal, single stage, centrifugal, motor drive	Warren
1	Combined main condensate and turbine drain pumps	Vertical, single stage, centrifugal, motor drive	Warren
3	Dynamo condensate pumps	Idaho,	Warren
1	Main feed pump	Horizontal, 3-stage, centrifugal, turbine drive.	Pump—Warren Turbine-Sturtevant
1	Aux. feed pump	(Same as main feed pump.)	
1	Port feed pump	Horizontal, single stage, centrifugal, turbine drive.	De Laval
1	Aux. port feed pump	(Same as port feed pump.)	
2	Emergency aux. feed pumps	Vertical, steam, double-acting.	Warren
2	Fire and sanitary pumps	Horizontal, 2-stage, centrifugal, motor drive.	Warren
2	Emergency fire and bilge pumps	Vertical, steam, double-acting	Warren
2	Hand fire pumps	Double-acting	Rumsey
2	Bilge and ballast pumps	Horizontal, single-stage, centrifugal, motor drive.	Warren
1	Emergency submersible bilge pump	Vertical, single-stage, centrifugal, motor drive.	Warren
1	Lubricating oil pumps	Vertical, screw type, motor drive.	Quincy
1	Lubricating oil purifier pump	Horizontal, rotary motor drive.	Northern
2	Emergency fuel oil service pumps	Vertical, steam, double-acting.	Warren

No.	Item	Type	Maker	No.	Item	Type	Maker
2	Fuel oil transfer pumps	Horizontal, screw-type, motor drive.	Quimby	2	Dynamo air ejectors	Ditto	Westinghouse
1	Fuel oil service pumps	Horizontal, screw-type, motor drive	Quimby	2	Air compressors	Vertical, duplex, 2-cyl., single acting, motor drive	Worthington
2	Drinking water pumps	Horizontal, single-stage, centrifugal, motor drive.	Warren	2	Lubricating oil purifiers	Super-centrifuge	Sharples
2	Washing water pumps	Ditto	Warren	1	Gland leak-off ex-hauster condenser	Vertical Straight tube	Sturtevant
2	Ice water pumps	Ditto	Warren	111	Soot blowers	Valve-in-head	Bethlehem
2	Hot water pumps	Horizontal, single-stage centrifugal, motor drive	Warren		Pump regulators		Diamond
2	Priming pumps	Hytor	Nash		Pressure regulators		Swartwout
2	Boiler test pumps	Vertical, steam, double-acting	Warren	1	Revolution counter and tell-tale	Averaging 2-shaft	Leslie
2	Sump pumps	Vertical, single-stage centrifugal, submerged, motor drive	Gould	2	Torsion meters		Cummings
2	CO2 condenser circulating pumps	Horizontal, single-stage, centrifugal, motor drive	Warren	1	Machine shop tools		J. T. Ryerson
3	Cargo brine pumps	Ditto	Warren	1	Steering engine	Electro-hydraulic 4-cylinder	American Eng'g. Co.
1	Ship's stores brine pump	Ditto	Warren	1	Telemotor		McLeod & Sons
2	Hand pumps	Rotary	Rumsey	2	Liquidometers		Liquidometer Corp.
4	500-kilowatt generators	240/120 volts, geared turbine-driven	Westinghouse	2	CO2 Indicators	Ranarex	Permutit Co.
1	30-kilowatt generator (emergency)	120 volts, diesel engine-driven	Generator—Westinghouse	2	Oil separators	"Short" alarm service tank	C. V. Lane
1	Air compressor for above	Motor drive	Supplied with 30-kilowatt generator	2	Fuel oil meters	Rotating disc	Buffalo
1	Circulating water pump for 30 kilowatt generator	Horizontal, single-stage, centrifugal, self-priming	Nash	1	Windlass	Horizontal, spur-gear, dual motor drive, 2 wildcats, 2 gypsies	Bethlehem
8	Forced draft blowers	Vertical, motor drive	Sturtevant	1	Capstans	Self-contained, motor drive	American Eng'g
	Smoke indicators		Wager	8	Cargo winches	Single geared, high speed, motor drive	Cunningham
2	Feed water heaters	Vertical coil	Davis	2	Cargo winches	Double reduction, heavy duty, motor drive	Cunningham
4	Lubricating oil coolers	Vertical	Bethlehem	1	Main switchboard		Westinghouse
2	Evaporators	Vertical coil	Davis		Storage batteries		Electric Storage Battery Co.
2	Distillers	Vertical coil	Davis		Lighting fixtures	Decorative	Black & Boyd
2	Filters	Paracoil	Davis		Lighting fixtures	X-ray reflectors	Curtis
4	Fuel oil heaters	Vertical coil	Bethlehem-Dahl		Lighting fixtures	General	Lovell-Dressell
1	Fresh water heater	Vertical — controlled by therm. valve	Alco products		Lighting fixtures	China	Lenox
1	Air separator	Vortex	Western Eng'g.		Sign Lights	Polarite	Frink Co.
2	Main air ejectors	Twin 2-stage with inter- and after-condensers	Westinghouse		Bracket fans		Westinghouse
					Portable airheaters	1000-W. "Wesix"	Western Eng'g. Co.
					Pitometer log	Pitometer	Kearfott
					Taff-rail log	Electric	Walker-Trident
					Telegraphs	Electric navy type	Chas. Henschel
					Searchlights		Sperry
					Ship's telephones		Chas. Henschel
					Passengers' telephones	400-line, 1-position board	Western Elec. Co.
					Electric clocks	All public spaces	Landis & Gyr.
					Pyrometers, etc.		Brown Inst.
					Pneumercators		Pneumercator Co.



One of the unusual features on the Steamship Mariposa is the completely enclosed promenade deck as shown in the illustration. Kearfott sliding plate glass windows make each side of this vessel a perfect sea-view promenade. As the bulk of her service operation lies in tropical or subtropical zones, this feature will be very highly appreciated.

The Maiden Cruise

California State Nautical Schoolship

*Steamship California State, with Full Complement of Officers
and Cadets, Now on the Pacific for a Six Months
Cruise Around the Horn*

AT LAST, all the red tape has been shorn away and, after a rather disheartening struggle by a very ardent group of hard-fighting enthusiasts, California has not only a going Nautical School, but a fine school ship; and that ship, California State, fully equipped and supplied, is out on the Pacific with eight competent officers and 120 cadets, making for Balboa and the long swing around South America.

After the legislature of California, urged by many individuals and organizations, had passed the Nautical School Act, appropriating \$115,000 every two years for the expenses of the



California Nautical School Ship California State.

school, a Board of five Governors was appointed, consisting of John C. Rohlfs, Captain Charles W. Saunders, Sr., Captain Leighton M. Edelman, G. Allan Hancock, and (ex-officio) the State Superintendent of Public Instruction. The men named are men of ripe shipping and business experience and are intensely devoted to the idea of the Nautical School from the viewpoints of both practical and human interest.

For two years this board has patiently worked with the official red tape entanglements at Washington to get the selected school ship reconditioned, altered, and equipped to suit the needs of the school and has overcome every obstacle and weathered every storm of criticism, until now the people of California have this good ship California State with 120 stalwart California lads in active sea training.

California State will call at Balboa as her first stop. By that time the ship and her crew will have been at sea between two and three weeks. The ship and her crew will have become well acquainted with each other and will be in first class condition, and from then on, at Callao, Valparaiso, Panto Arenas, Buenos Aires, Montevideo, Rio, Port of Spain, Cristobal, Balboa, Mazatlan, San Diego, Los Angeles, Monterey, and San Francisco the ship will be on parade carrying to the people of the Latin American republics and to Californians alike an effective display of interest in the future of the American merchant marine.

As we go to press, word comes that on this initial cruise the Steamship California State will probably, on leaving the last port on the East Coast of South America,



View in the cadet quarters on board the Steamship California State showing cadets' lockers and folding Simmons berths.



View in the pilot house of the Steamship California State featuring the Kolster radio compass.

ca, proceed up the Atlantic Coast and go up the Potomac to the Port of Washington, D.C., to demonstrate at headquarters the showing that is being made by the California School Department and the California Cadets, with this vessel that was allocated for their use by the United States Navy.

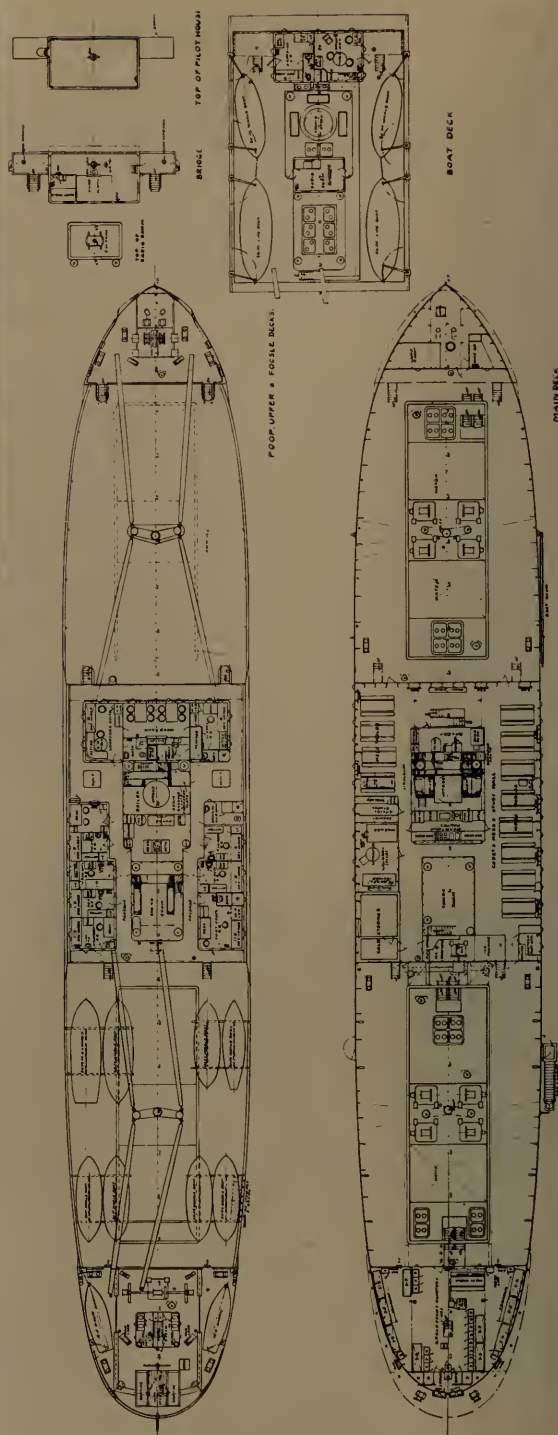
California State is a thoroughly seaworthy, sturdily built, deep-waisted two decker of the so-called "Lake type." She is 253 feet 6 inches long between perpendiculars, 43 feet 8 inches molded beam, and 28 feet 4 inches molded depth. She is propelled at a sea speed of about $9\frac{1}{2}$ knots by a single propeller, direct-connected to a 1450 indicated horsepower, triple expansion engine, steam for which is generated at 190 pounds pressure by two oil-burning Scotch marine boilers.

Just prior to her departure on her initial school ship cruise she was thoroughly overhauled, reconditioned, and altered at the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., San Francisco. The work included the installation of additional fuel oil tanks, giving a cruising radius of over 70 days steaming, or approximately 15,000 nautical miles. Fresh water tanks of large capacity were installed; and both fuel oil and fresh water tanks were so located and arranged that their contents serve ideally as ballast.

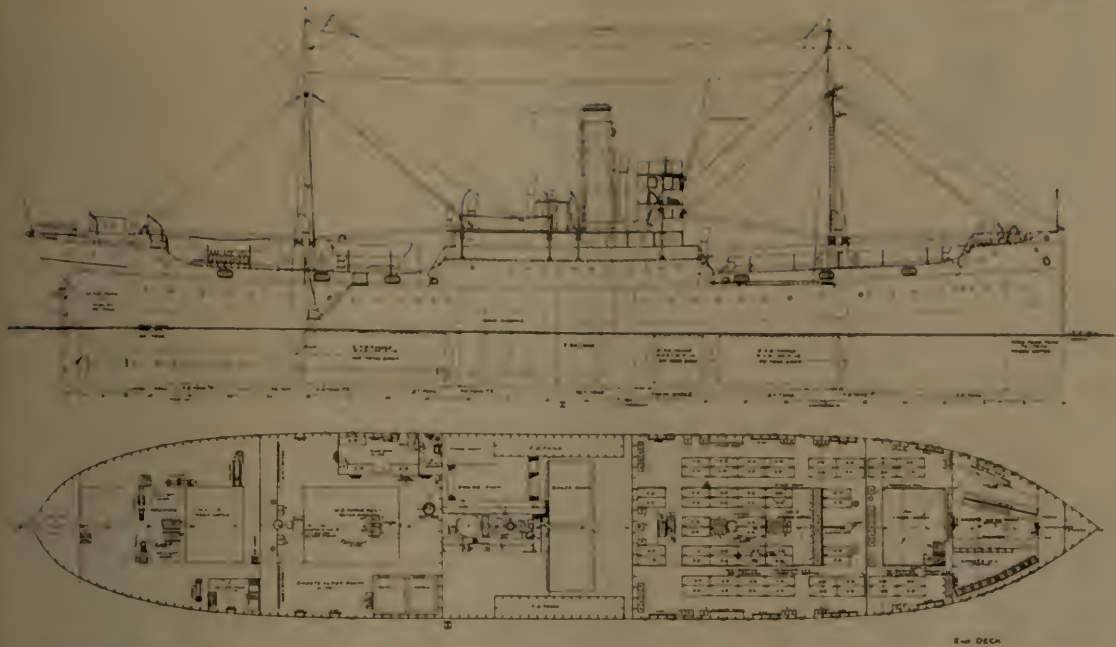
The entire machinery plant was overhauled and made as good as new. To take care of additional electric load imposed by the electric hotel equipment installed and also to provide a steam turbine demonstration for the marine engineering cadets, two 25-kilowatt turbo-generating sets were added to the 19-kilowatt reciprocating engine set already on the ship. These generators and the switchboards and wiring incident thereto were General-Electric equipment from the United States Navy stock stores.

Two York refrigerating machinery units (one spare) are installed to take care of ship's stores, and Frigidaire cabinets are fitted in ward room pantry and in galley store room.

The galley and pantries are equipped with: a Ray oil



Plans of the poop deck, upper deck, forecastle deck, main deck, boat deck, and bridge of the Steamship California State. Note the large space devoted to mess tables and study hall amidships on the main deck.



Outboard profile, and plan of second deck of the Steamship California State, showing the arrangement of engine and boiler rooms, fuel oil and fresh water tanks, and the quarters and washrooms for the cadets.

burning range; an Edison General-Electric bake oven; a Crescent dish washer; a Hobart mixer; electric meat and bread slicers; a fine installation of monel metal topped serving tables; steam kettles; and many other conveniences for the chef and his assistants. This culinary equipment, together with the tableware, was supplied by the Dohrmann Hotel Supply Company of San Francisco.

Cadets' quarters were equipped with comfortable berths by The Simmons Company of San Francisco, with metal lockers by Worley and Company of Pico, California. Crane plumbing fixtures are used throughout.

A Sperry master gyro-compass controls five repeaters, one on each wing of the bridge, one on the poop deck aft, one at the steering wheel inside the pilot house, and one under the Kolster radio compass inside the pilot house. Two interesting pieces of equipment in the pilot house are the Paulin System barometer and the Universal drawing machine for use on charts. The first gives very accurate readings of pressure for weather prediction and the second offers a much more accurate and quicker method of plotting positions on charts than the parallel ruler and protractor method.

The radio house on the boat deck is equipped with United States Navy radio. A carbon dioxide fire extinguishing system was installed to protect the engine and fire room spaces; and throughout the ship at convenient locations there are portable extinguishers, fire axes, and fire hose with fire-main outlets.

In the class rooms, study hall, mess room, crew's berthing and mess, sick bay, and officers' quarters, the decks are covered with Navy Standard linoleum. To maintain comfortable temperature in living quarters, steam radiators are installed, and a complete system of mechanical ventilation served by electrically operated blg blowers. Where advisable, the bulkheads, ship sides,

and ceilings in way of these quarters are insulated with 1-inch cork sheathing.

California State carries an unusually complete equipment of boats, including one 14-foot wherry, seven 20-foot whaleboats, one 24-foot whaleboat, one 21-foot motor dory, and one 24-foot motor launch. After all alterations were completed and all new tanks installed, she was subjected to Navy Standard inclining tests to determine her righting ability or seaworthiness in any condition of loading and was found to be thoroughly safe in this respect. During the course of the reconditioning, all of her steam fuel oil and water piping, her steam boilers, her watertight bulkheads, and her fuel oil and fresh water tanks were given severe tests on tightness and strength.

Officers in charge of the California State are:

Commander—Emile Topp
Executive Officer—M. E. Crossman
Second Officer—George Barkley
Third Officer—R. C. Sheaf
Fourth Officer—William Glenn
Chief Engineer—H. C. Dwyer
First Assistant—E. F. Jaeger
Second Assistant—Mr. McKay.

Sometime in May or June the Golden Gate will be welcoming these officers and their 120 charges back to their home port. The 120 are hand-picked from the High Schools of California. They are going out with high hopes and with glowing aspirations. They will be coming back with enlarged horizons and expanded visions of the possibilities for American youth in the future of our American merchant marine. The investment that California and the United States are making in the lives of these young men is of immeasurable significance to the future of American commerce on the Pacific Ocean.



Marine Equipment

PNEUMATIC CENTRIFUGALS ~ ALUMINUM SOLDER
NEW FLEXIBLE TUBING ~ STIRRUP SIDELIGHTS

Marine Industry Moves West

Brings Line of Heat Exchangers

FRED S. Renauld and Company, manufacturers of the well known Crescent Line of heat exchange apparatus and formerly located at New Orleans, Louisiana, have moved to Los Angeles, California, where they have established a modern factory, thoroughly equipped to build their full line of Heat Transfer Apparatus for marine use. This firm also manufactures fuel oil burners, fuel oil combustion systems, and a large line of specialties for the petroleum industries.

One of the well known specialties of Fred S. Renauld and Company is the "Crescent Line of Replacement Coils" which is manufactured in sizes, shapes, and materials to fit any type of heat exchange apparatus used aboard ship. These coils are carried in stock by agents in all the principal ports of America.

This is a very valuable service to the American merchant marine, as any ship can obtain replacements from stock at any of the majority of the ports along the Atlantic, Gulf, and Pacific Coasts, or on the Great Lakes. So well and favorably has this service become known, that there is now arising a demand

for its extension to foreign ports.

The Crescent Line includes: Feed water heaters; salt water heaters; storage heaters; evaporators; distillers; instantaneous heaters; pressure filters; feed water filters; grease extractors; fuel oil burning systems of steam atomizing, air atomizing, and mechanical types; and fuel oil heaters. A few of the items that make up this extensive line of apparatus are illustrated herewith.

In connection with its manufacture of replacement coils, Fred S. Renauld and Company publishes Bulletin No. 107 which is claimed to be the only reference data book covering every size and type of coil used by the marine trade. This may be had free on request.

Fred S. Renauld and Company are represented in the marine trade by the C. E. Rhodes Company at San Francisco and by the Marine Engineering & Supply Company at Wilmington, California.

As promptly as possible, Fred S. Renauld Company will select representatives in the Columbia River and Puget Sound ports, so that the "Crescent" Line may be adequately stocked to meet all marine needs.



EVAPORATOR



DISTILLER



FEED WATER HEATER



DISTILLED
WATER PLANT



STORAGE WATER HEATER



WATER HEATER
ELEMENTS



OIL HEATER

Air-Operated Centrifugal Pumps

A NEW centrifugal sump pump, the Cleco-Deming pump, bearing a number of exclusive features and specifically designed for general work requiring fast and effective expulsion of water, oil, and other liquids, has just been produced by the Cleveland Pneumatic Tool Co.

Exclusive features of the C-D pump as it will be known, include unusual economical operation through a material savings in air consumption. It is very compact, with a low center of gravity that prevents it from being upset, and has an oil reservoir capacity of unusual size.

The Cleco-Deming pump is adapted for service wherever liquids accumulate and compressed air is available and has the operating power unit built integral with the pump housing, making a portable outfit easily handled by one man.

The motor of the pump is operated by compressed air and is automatically lubricated from a reservoir located in the cylinder body. The Cleco "Patented oil control" corrects all lubrication troubles as the oil passes through large, unrestricted ports direct to the bearings and rotor, insuring steady and free lubrication without danger of any foreign matter clogging the oil supply.

The pump performs while entirely or partially submerged, and functions efficiently in either position. The impeller is made of hardened bronze and is dynamically and statically balanced. It is designed especially for the exact



The Cleco-Deming centrifugal pump.

conditions that the pump will be required to meet when operating in sumps, manholes, bilges, tanks, and other places. The water passages are correctly proportioned and screened against the entrance of stones, leaves, dirt, and other foreign matter.

The air consumption is from 15 to 20 cubic feet per minute less than any similar type of rotary pump. With a 20-foot head, the capacity of the C-D pump is 142 gallons a minute at 90 pounds air pressure and 137 gallons a minute at 80 pounds air pressure. The unit weighs 36 pounds. Its outlet connection is a 2½-inch standard pipe thread and its inlet is ½-inch standard pipe thread.

Pneumatic Valve Grinder

A NEW, speedy, air-operated valve grinder, designed to meet the needs of all repair and service stations, garages, and automotive shops equipped with compressors, is being produced by the Cleveland Pneumatic Tool Co.

Among the chief advantages of the Cleco lightweight, low-priced valve grinder in assuring better valve seats are its size and shape which make for easy and convenient handling, its speed which reduces the time of hand grinding by 75 per cent., the fact that it operates with no vibration, and, aside from occasional lubrication, re-

quires no adjustment or care. Its oscillating movements provide alternate one-eighth turns on the face of the valve which eliminate possibility of grooves and assure equal grinding for the entire circumference.

The Cleco valve grinder is equipped with adapters to engage slotted or drilled valves of all gas or oil engines in sizes up to and including 2½ inches. A vacuum cup is provided for plain-surfaced valves.

The grinder operates automatically when pressure is applied by the operator and its speed is increased or diminished according to

the pressure applied. It is so sensitive that the operator can "feel" when the valve is correctly seated. It operates smoothly and quietly, with no vibratory action and automatically stops when lifted off the valve.

Its use requires only the attachment of a 3/8-inch hose running to any air line and of a suitable length.

This grinder weighs only 1½ pounds, is 8 inches in length, with an outside diameter of 2 inches. It consists of five main parts—the body, steel shaft, steel valve block, cylinder and steel driver. It consumes only 6 cubic feet of air per minute and will operate at any speed up to 3000 oscillations a minute.

A New Aluminum Solder

OF particular interest to the marine field is the discovery of an aluminum and all metal solder by the Allied Research Laboratories of Glendale, California. This solder is called Alumaweld, and, as the name implies, actually fuses or welds with the metal being repaired to form a single piece.

Cracked or broken engine parts, leaking pipe systems on boats, damaged aluminum cooking utensils—in fact, any metal damage—can be repaired quickly and inexpensively with this new solder.

Alumaweld is applied to aluminum, pot metal, and die castings with an ordinary soldering iron or blow torch. The solder melts at an exceedingly low temperature, but once melted, it requires a much higher temperature to melt a second time. This makes it possible to withstand any heat developed by ships' engines.

Tests have been made with this solder over a period of years and in every instance have been successful. It is much stronger than ordinary solder, quite ductile, and will take a nice polish over which chromium or any other plating can be applied. Alumaweld will not corrode under any ordinary circumstances.

Alumaweld is expected to save considerable time and money on ship repairs. It can be used by any one, and will replace much welding at a fraction of the time and cost, without danger of cracking the metal during preheating and cooling.

Liquid Level Gauge

THE T. W. McNeill Engineering Equipment Company, Chicago, announce the perfection of a new concentric marine type remote liquid level gauge for use with marine boilers and for measuring liquid levels in tanks aboard ship.

This new liquid level gauge consists of an upper and lower mercury element mounted on a steel plate. The outer chamber of each element is connected to the other element with an ordinary gauge glass made of special glass with suitable glands and stuffing boxes. The inner chambers are connected through the back of the steel mounting plate with $\frac{1}{2}$ -inch pipe to the water column the contents of which it is desired to measure.

The McNeill Liquid Level Gauge is simply a mercury V-Tube, the

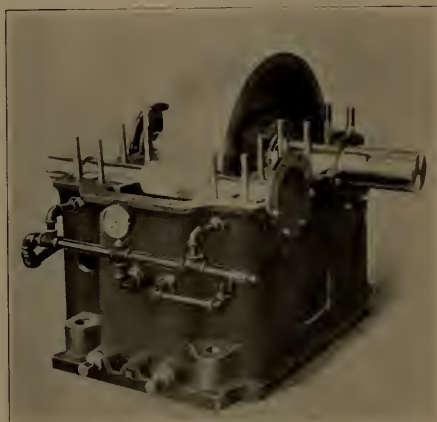


two legs of which are arranged concentric to each other, where the movement of mercury is at all times the direct result of the difference in end pressure of the two columns connecting the instrument to the variable level of water or liquid to be measured. Black liquid is the indicating medium which movement may be direct with the movement of liquid being measured or may be any pre-determined ratio of that movement.

The gauge is subject only to boiler pressure and never to boiler temperature. It can be located anywhere regardless of the position of the regular water column without the slightest effect on its 100 per cent. accuracy.

This gauge should be particularly valuable in checking water tenders, as it may be installed in the main operating station directly in front of the engineer.

A New Series High Speed Gear Units



The Farrell-Birmingham speed adjustment unit, with cover removed.

STANDARD industrial gear units are designed for use with electric motors running at a maximum speed of 1800 revolutions per minute, and they are suitable for reducing speed but not for increasing speed, and for tooth velocities not exceeding 2000 feet per minute.

When a gear unit is required for connection to a steam turbine or for any other purpose where the speed of the pinion shaft is over 1800 revolutions per minute, it has been considered special. Now, however, the Farrell-Birmingham Company, Inc., has developed and standardized a series of gear units suitable for speeds up to 6000 revolutions per minute and powers from 120 horsepower to 2500 horsepower, with ratios up to 10 to 1 for

either increasing or reducing speed.

Our illustration shows one of these gear units with the cover removed to show the gears, which are the Farrel-Sykes herringbone continuous tooth type. A complete lubrication system is provided, together with an oil cooler consisting of a coil of copper pipe placed in the bottom of the gear case. The inlet and outlet pipes can be seen in the illustrations.

This new series of gear units is especially adapted for connecting diesel or gas engines to centrifugal pumps. The latter are designed to operate at speeds ranging from 1200 to 3600 revolutions per minute and the larger engines usually operate at speeds from 225 to 600 revolutions per minute.

1932 Calendars.—While not as numerous as other years, a number of firms connected with the marine business have issued their customary beautiful calendars this year. Among those received at this office were:

Columbian Rope Company — A beautiful reproduction in colors of a painting by Charles Robert Patterson depicting a square rigger under full sail with a setting of moonlight playing through clouds on the ocean.

The Cooper - Bessemer Corporation.—A well planned calendar in six sheets, with four months on each sheet, illustrated by color pictures showing, on the first page, the new cruiser yacht Caroline, and on following pages various installations of Cooper-Bessemer engines.

De Laval Pacific Company. A beautiful calendar in four panels, one on top of the other. The top one is a spirited color painting entitled "The Horse Raid." The other three panels contain each a calendar of one month of the year, two of them individually illustrated to advertise De Laval products.

General Electric Company. This is a large calendar in twelve sheets, similar to 1931, with a fine colored reproduction of a beautiful color painting by Walter L. Greene or Mott Smith, depicting the wide scope in our present civilization for the use of Electricity.



Tube-Turn Welding Fittings

A NEW series of fittings for pipe welding has recently been announced by Tube-Turns, Incorporated, Louisville, Kentucky.

Like all other Tube-Turns, the new Series 1R fittings are seamless. They are made by the exclusive Tube-Turn process, which produces uniform wall thickness at all points, insures uniform radius and eliminates all locked-in stress in the metal. Like all other Tube-Turns, the new series also has the same outside diameter, the same inside diameter, and the same wall thickness and wall tolerance as the pipe with which it is used. This, together with the fact that it is made of the

same material, greatly facilitates lining up and welding.

The addition of the new Series 1R rounds out and completes the Tube-Turn line, affording 45 and 90-degree elbows and 180 degree return-type fittings for welding in sizes $\frac{3}{4}$ -inch through 20 inches and in virtually all the weights required by modern piping.

Tube-Turns, Incorporated, pioneered fittings for welding in this country and its product has been accepted as the standard. Series 1R Tube-Turns are carried in stock by all Tube-Turn distributors. Descriptive literature and prices will be sent on request.

Whistling Buoys for Lighthouse Service

ALTHOUGH Cincinnati is a long way from salt water, the Stacey Manufacturing Company has just completed there the last of a number of whistling buoys on a contract received from the United States Lighthouse Bureau.

Shipments have been made to three points on the Atlantic seaboard and to one on the Pacific. Each buoy is 39 feet tall and weighs 20,050 pounds each. The buoy is made up of a large cylindrical pontoon to which is hung a compression chamber made up of a hollow tube and weight at the bottom. When the buoy is lowered into the sea this tube forms an air chamber and the motion of the buoy bobbing in the water causes the air in the chamber to be compressed and to blow a whistle mounted on the superstructure.

Inside the pontoon provision has been made for the storage of gas which is used to illuminate the beacon. Fitted to the bottom of the pontoon section are rings for attaching the anchor chains. A superstructure of structural steel built on the deck of the pontoon supports the whistle and beacon light. Due to the terrific treatment to which these buoys are subjected, they are built unusually strong and represent a fine job of engineering design.



Above are shown eight large steel pontoons built by the Stacey Manufacturing Company for the United States Engineers at Memphis, Tennessee. These pontoons are 28 feet in diameter; 5 feet 6 inches deep. They are used as floating supports for 16-inch diameter dredge pipe.

At right are shown two large whistling buoys manufactured by the Stacey Manufacturing Company for the United States Lighthouse Bureau. These buoys were built at Cincinnati and shipped by rail to the Atlantic Coast.





The Chas. C. Moore Building at the corner of First and Mission Streets, San Francisco.

Engineering Firm Moves Back Home

CHAS. C. MOORE & CO. was organized in 1895 by Chas. C. Moore, operating under the name of Chas. C. Moore & Co., located at 32 First Street, San Francisco, California, and engaged in the design and construction of steam power plants and the sale and installation of high grade steam machinery and specialties.

Due to the expansion of business, in 1903 the company moved to the corner of First and Mission Streets, where they established modern offices in the Union Foundry Building, owned by the Donohoe Estate, which building covered the entire block from First Street to Fremont Street. At this time the company was incorporated under the corporate name of Chas. C. Moore & Co. Engineers. The company was forced to abandon these offices at the time of the fire in 1906.

Shortly thereafter this real estate holding, belonging to the Donohoe Estate, was subdivided into three parts and Chas. C. Moore & Co. Engineers purchased the hold-

ing on the corner of First and Mission Streets. A temporary building was constructed in 1907, which was occupied until 1912, when the company moved to the Paraffine Paint Building. On January 1, 1915, they moved to the Sheldon Building, where the company has since been located.

Chas. C. Moore & Co. Engineers in 1920 constructed the present building on the corner of First and Mission Streets for the textile interests. The leases expired January 31, 1931, and the building has been entirely renovated and modernized in every way, and C. C. Moore & Co. Engineers and The Babcock & Wilcox Co. will occupy the entire top floor, with modern sales and engineering offices. Friends and customers are cordially invited to visit the new offices at any time.

In the marine field, Chas. C. Moore & Co. Engineers are Pacific Coast distributors for a complete line of steam specialties, including the products of:

The Dampney Company of America, The Babcock & Wilcox Company, The Babcock & Wilcox Tube Co., The Cochran Corporation, The Diamond Power Specialty Company, and

The Lagonda Manufacturing Co.

Old San Franciscans will be interested in this reclaiming for steam engineering of the corner of First and Mission Streets. It was on this corner that Peter Donahue established his pioneer foundry in the "good old days of '49." Later the firm of Prescott and Scott expanded the pioneer effort into a famous engineering partnership that was responsible for much of the great mining machinery of the Sixties and Seventies. Here in 1881 was born the Union Iron Works, incorporated to establish steel ship-building on the Pacific Coast. During the late Eighties and most of the Nineties, that part of San Francisco immediately surrounding First and Mission was one of the busiest industrial areas in the United States.

Stirrup Pivoted Sidelights



THE Stirrup type of pivoted sidelight, developed by the British firm of J. Stone and Company, Deptford, is now manufactured and distributed in the United States by the American Locomotive Company, which is installing the lights on the four new Panama Mail liners now building at the plant of the Federal Shipbuilding & Dry Dock Company.

Our illustration shows one of these lights in the open and in the closed position. This fitting is known as the "Stirrup" sidelight because its operating handle—its principal feature—is shaped somewhat like a stirrup.

It consists of two main parts, the glass-holder and the fixed frame in which it pivots. To ensure watertightness, a rubber seating ring is fitted into an inwardly projecting rim on the inboard side of the fixed frame, so that as the pressure of water on the outboard side of the glass-holder increases, the greater becomes the pressure on the rubber seating, thereby resulting in increased watertightness.

To open this sidelight the glass-holder is moved outwards (that is outboard) and away from the rubber seating ring by means of a semicircular stirrup-shaped handle, which is pulled forward and swung completely across the light in a semicircular movement—this in turn operates, simultaneously, cams at the top and bottom of the sidelight,

each cam carrying a pivot of the glass holder. When the stirrup handle completes its travel, that is to the opposite side of the fixed frame, the glass-holder is free to pivot.

By a short return pull or forward movement of the stirrup handle the glass-holder can be locked in any pivoted position, this locking being obtained by the subsequent wedging of the outer edge of the glass holder against the smaller diameter of the inner edge of the frame. In the event of it not being desired to lock the glass-holder in its pivoted position the stirrup handle is retained in the "open" position; i.e. flush with the frame, thus leaving the glass-holder free to pivot.

To close the sidelight the stirrup handle is pulled forward and swung to the opposite side of the fixed frame—this action brings the glass-holder forward to the seating ring and locks it in a water-tight position.

The stirrup handle can be made to operate either right to left for opening and left to right for closing or vice versa. The glass holder can easily be removed for reglazing without disturbing the fixed frame.

Its neatness of appearance, ease of handling, and freedom from clips and similar fastenings make this fitting a desirable sidelight for all locations where the pivoted type can be used.

plied to such widely varied uses as lubrication, gum manufacture, electric wiring conduits, automobile exhaust pipes, radiator hose, shielding airplane radio, hydraulic and airbrake systems, and oil burners. It has withstood pressures of 10,000 pounds to the square inch and temperatures of over 500 degrees.



Fig. 2

Four of the many types of outer protection used on the new Bendix flexible tubing.

The hose is seamless from the tip of one fitting to the tip of the fitting at the opposite end because the fittings are brazed or welded, forming an integral part of the hose. This construction prevents leaks developing in the hose and breaks occurring between the hose and its fittings.

Made of special bronze alloy seamless pipe, the Bendix hose is corrugated in round-thread single lead deep wall form and does not contain welded, brazed, or interlocked joints. A protective casing, braided from copper, is designed to cover the hose with either one, two, or three layers, depending on the pressure the hose must withstand. As a protection against mechanical damage to the braid covering and to distribute the flexing action, the manufacturer recommends use of an interlocked, unpacked galvanized steel casing over all.

This new product is being made by the Bendix Stromberg Carburetor Company and orders for 3,000,000 feet for 1932 delivery are said to have been received prior to formal announcement. The hose is being manufactured at present with internal diameters of 3/16, 1/4, 3/8, 1/2, 3/4, and 1 inch, but engineers declare it can be made in practically any size desired.

New Seamless and Flexible Metallic Tubing

A SEAMLESS, flexible metallic tubing, which, it is claimed, will find an important place in practically every industry, has just been placed on the market by the Bendix Aviation Corporation.

The Bendix hose has been ap-

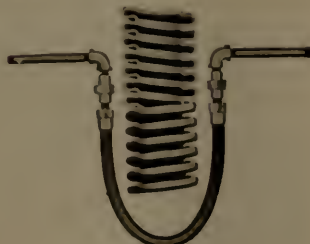


Fig. 1

Sectional view showing construction of the new Bendix tubing.



American Shipbuilding

Edited by H. C. McKinnon

Atlantic Coastwise Steamship Launched

The new steamship *Saint John*, the first of two express coastal liners being built at a cost of \$3,500,000 each by the Newport News Shipbuilding and Dry Dock Company for the United States-Canadian Service of the Eastern Steamship Lines of New York, was launched on January 9 amid fitting ceremonies and a distinguished gathering of persons. Mrs. Robert G. Stone, wife of a director of the Lines, was the sponsor.

A sister ship, the *Acadia*, will soon be launched from the same yard. Not only do these two high speed passenger and freight ships mark further evidence of the stimulus given to American shipping by the Jones-White Act, but they represent fruition of a building program undertaken by the Eastern Steamship Lines during the last eight years to modernize their fleets with the most luxurious and efficient vessels in the coastwise trade North of Hatteras.

They will operate in the Boston-St. John and New York-Yarmouth services under terms of a mail contract awarded to the Eastern Steamship Lines by the United States Post Office Department. A construction loan was granted by the Shipping Board as a further aid for these two ships.

Designed by Theodore E. Ferris, the well known naval architect, the *Saint John* is a vessel of the 3-deck complete superstructure type, with continuous bridge deck. She has a cruiser stern and bulbous bow with the stem raked forward, and a complete double bottom. Being an express passenger and freight ship, she has twin screws that will drive her at a speed of 21 knots, about 11,400 shaft horsepower (maximum) being developed by four Babcock & Wilcox water tube boilers fitted with Todd fuel oil burners, and two sets of single reduction geared compound turbines of the Newport News-Parsons type working under a pressure of 375 pounds and a temperature of 650 degrees

Fahrenheit at the boilers.

She can accommodate 745 passengers, 87 of which are in free berth travel, and has 159,000 cubic feet of space available for cargo.

All deck auxiliaries and most of the engine room auxiliaries are electrically driven, the exceptions being a number of steam-driven engine room pumps. Practically all of the galley equipment is electric also; but steam is used throughout the ship for heating purposes. Based on a total of 10,000 shaft horsepower and 28½ inches of vacuum, the fuel consumption rate is expected to be well below 0.80 pound of oil per horsepower per hour for all purposes.

Electric power for the auxiliaries is provided by three 250-kilowatt, 240-volt, steam turbine driven, direct-current, General-Electric generating sets operating on a condensing water rate of 16½ pounds per hour. There will also be a transformer for use of alternating shore current.

The main particulars of the *Saint John* are as follows:

Length, overall	402' 9"
Length, B.P.	387' 0"
Beam, molded	61' 0"
Depth, molded	29' 9"
Maximum load draft	20' 0"
Designed service load draft	18' 0"
Designed S.H.P. at 168 r.p.m.	9500
Bronze propellers, diameter about	12' 9"
Service speed, knots	18
Consumption per day, tons, about	60
Deadweight capacity on 20', about	2200
Deadweight capacity on 18', about	1200
Gross tonnage, approximately	5500
Net tonnage, approximately	3300
Cargo capacity, cubic feet, about	159,000
Bunker capacity, oil, tons	784
Fresh water capacity, tons	704
Passenger capacity	745
Crew, officers and men	178

The three hull decks — lower, main, and upper—are fully plated, the bridge and promenade decks are partially plated, and the boat deck and tops of houses are a tongue and groove joinder deck covered with canvas with felt laid under. Various parts of the decks are stiffened for gun foundations as approved by the Navy Department.



View of the Steamship *Saint John* on the ways of the Newport News shipyard ready for launching.

All deck houses are of steel except the wooden boatdeck house which will be paneled with Vehisote and teak. From the top of the boatdeck house to the bottom coaming of the promenade deck house there is an expansion joint to relieve the superstructure of working strains.

Subdivision of the hull is in excess of the requirements of the 1929 Rules of the International Conference on Safety of Life at Sea. There are 9 transverse water-tight bulkheads extended to the upper deck—the forepeak bulkhead carrying up to the forecastle deck—forming ten compartments and making this ship a two-compartment vessel.

Only one grade of passengers will be carried in the 266 rooms, which are arranged as follows: 14 suite rooms with all conveniences; 15 rooms with toilet, shower and twin beds; 12 rooms with toilet and shower; 4 rooms with toilet and twin beds; 32 rooms with toilet; 95 three-berth staterooms; and 94 double-berth staterooms. On the upper deck forward are the main dining saloon and pantry, with purser's office abaft. Forward on the promenade deck is the library and writing room; and aft are the lounge and music room, smoking room, ballroom, verandah cafe, and open deck space. On the boat deck are quarters for the deck and engineer officers, and petty officers. Down below on the main deck are quarters for firemen, waiters, and the colored crew. The deck crew is forward on the upper deck. Passenger quarters are practically everywhere else.

Complete mechanical ventilation of all passenger and crew spaces is provided by various supply and exhaust systems with some 25 motor driven fans.

A considerable amount of Haske-lite paneling is used.

Kearfott all metal vertical sliding windows are used for the enclosed promenade and in the bridge and promenade deck houses. As is usual, in all new American ships, the vessel will be rat-proofed in accordance with the requirements of the United States Public Health Service. The various steward's cold storage rooms will contain about 1000 cubic feet to be cooled by the ship's two motor-driven 6-ton Brunswick - Kroeschell ammonia compressors.

For fire protection there are complete Rich fire detecting and Lux fire extinguishing systems, an automatic fire alarm system in



Artist's drawing of the Steamship Saint John as she will appear in operation between New York and Boston and the Ports of Yarmouth and St. John.

each compartment and stateroom, and steam smothering lines for cargo compartment. In addition thwartship steel fire screen bulkheads with sliding doors are fitted on all passenger decks. Watertight bulkhead doors of the electrically operated sliding type and of the hinged type will be fitted in various main bulkheads.

Other special equipment of the most modern type will include an R.C.A. radio equipment and telephone, complete telephone system for passenger use, ship's intercommunicating systems, a Fathometer, radio direction finder, Sperry gyro-compass and mechanical steering gear, an automatic steam chime whistle, one 18-inch 30,000,000-beam candlepower Sperry searchlight, and two Sperry incandescent searchlights.

River Vessel Planned.—Plans are expected to be announced by the first of February by the Harkins Transportation Company of Portland, Oregon, for the construction of a passenger and freight river vessel for operation between Portland and Astoria. This company took delivery last June from the Albina Engine and Machine Works of Portland of the motorship L. P. Hosford, and it is reported that the new motorship will be similar to this. The L. P. Hosford is 160 ft. long and is powered by an 8-cylinder 500 brake horsepower Atlas diesel engine. She has accommodations for 50 passengers in 19 staterooms and a large number of day passengers. She is unusually well equipped to handle freight, being fitted with a Barlow elevator to enable rapid loading of freight at any stage of the river. L. P. Hosford is president and manager of the company.

Boat Building Contract Let.—A 55-ft. ranger boat will be built by the J. M. Martinac & Co., Tacoma,

Wash., for the Department of Interior for heavy duty out of Ketchikan and Juneau, under the Bureau of Forestry. The builder was awarded the contract on a low bid of \$12,800. She will have a breadth over frame of 14 ft. and depth of 7 ft., molded, and will be equipped with full diesel engine developing 75 horsepower at 650 revolutions per minute. Bids were handled by J. R. Ummel, purchasing agent and office manager for the Department of the Interior at Seattle.

Alaska Vessel Launched.—The North Star, the fine new motorship building at the Berg Shipbuilding Company, Seattle, for the Bureau of Indian Affairs, Department of Interior, for Alaska service, was launched January 18. The vessel will replace the old steamer Boxer, veteran of many years' service. She will cost about \$400,000 when completed.

The North Star has the following dimensions: Length between perpendiculars, 210 ft.; molded beam, 41 ft.; molded depth, 21 ft. 6 in.; loaded draft, 16 ft. She is of wooden construction, and of specially strong framing and sheathing to withstand contact with ice floes. She will be powered by a 1500 horsepower McIntosh & Seymour diesel engine, guaranteed to drive the vessel at 14 knots speed.

Miss Elizabeth Pullen, of Juneau, daughter of the manager of the Alaska Light and Power Company and student of the University of Washington, was the sponsor. The launching ceremony was attended by Governor George M. Parks of Alaska, Captain S. T. L. Whitlam will command the new motorship, which is scheduled to make her first cruise this summer.

Repair Job.—The Albina Engine & Machine Works, Portland, Ore., was awarded contract for repairs to

the Blue Star Line steamer Viking Star, the work costing in the neighborhood of \$33,000. The vessel suffered extensive damage early in January, when her stern swung into a submerged object after the ship had dropped anchor at Fales Landing in the fog. She had already taken on a fair amount of cargo and may have to be unloaded before work of repairing can proceed.

River Ferry Ordered.—The Multnomah County (Oregon) Highway Department, Geo. W. Buck, roadmaster and county engineer, recently awarded contract to Erickson & Klepp, Rainier, Oregon, for the construction of a double-end, diesel-powered ferryboat on a low bid of \$6610. The Atlas-Imperial Diesel Engine Company was awarded contract for the 30-horsepower diesel engine installation on a bid of \$3896.30. The boat is for operation between the mainland and Sauvies Island across the Willamette Slough and runs on a cable. She will be 80 ft. long, 26 ft. wide, the hull being of wooden construction. She will replace the old ferry Evans, which will be scrapped when the new boat is completed.

Motorship Planned.—According to reports from New York, the American South African Line, 39 Cortlandt Street, New York, has asked for bids for the construction of a motorship for operation with the motorship City of New York and to be similar to that vessel. The City of New York, which was built in 1930, is 470 ft. 8 inches long overall, 61 ft. 6 in. beam, and 37 ft. depth, and is of 14,950 tons displacement. She is powered by two 4-cylinder Sun-Doxford opposed-piston diesel engines, developing a shaft horsepower of 5400.

To Recondition Freighters.—The Black Diamond Steamship Corp., 39 Broadway, New York, operator of the American Diamond Line, is reported to have submitted to the Shipping Board its plans and specifications for the reconditioning of five freighters of this fleet. The vessels will be altered to bring the freighters more up to date, to decrease operating costs, and to increase their speed from 10 to 13 knots.

Lake Vessels to be Converted.—The freighters T. H. Wickwire, Jr., Louis R. Davidson, and William T.

Roberts, operated by the American Steamship Company of Buffalo, are being converted to self-unloaders at the yards of the American Ship Building Company of Cleveland.

Patrol Boat for New York.—Bids were opened last month by the Supervisor of New York Harbor, 39 Whitehall Street, New York, for the construction of a 121-ft. steel hull, diesel-driven patrol boat.

Reconditioning Passenger Accommodations.—The Moore & McCormack Company, 5 Broadway, New York, has received bids for reconditioning four Hog Island type freighters of the Santic Line to provide accommodations for passengers. George C. Sharp, 30 Church Street, New York, has prepared the plans and specifications. In addition, it is planned to provide refrigerated cargo capacity of 18,000 cubic feet and additional cold storage space for ship's stores.

Towboat Construction Contract.—The Camulette Shipbuilding Co., Inc., Slidell, Louisiana, has been awarded contract by the Louisiana Texas Waterways Corp., 408 Maritime Building, New Orleans, La., for the construction of two steel, diesel-powered, tunnel-screw towboats, to be 100 feet long, 24 feet wide, and 4 feet deep. This yard also has an order from the same company for building ten steel barges, 120 by 28 by 7 feet dimensions.

Two Dredges for Army Engineers.—Bids will be opened February 5 by the Chief of Engineers, United States Army, 2834 Munitions Building, Washington, D. C., for the construction of one or two stern-wheel steam-driven 20-inch pipe line dredges for the Engineering Depot at St. Louis. The dimensions will be 200 ft. molded length; 47 ft. 10 in. molded beam; 8 ft. molded depth.

Fireboat Completed for Vancouver.—The Vancouver (British Columbia) Harbour Commission has put into operation the fireboat Orion. The Orion was formerly a whaling schooner and she was reconditioned and converted by the North Vancouver Ship Repairs, Ltd. She has a length of 94.1 ft. between perpendiculars, breadth of

17.4 ft., and molded depth of 10.6 ft. She is a single deck, steel screw steamer propelled by triple expansion steam engines, and was built at Oslo, Norway, in 1904. She has been equipped with steam pumps, connected to her main steam plant, rated 2000 imperial gallons per minute capacity at 90 pounds pressure; and gasoline engine driven pumps of about 5000 imperial gallons capacity at 120 pounds pressure. She has been equipped with two 6-cylinder Vivian gasoline engines to operate these latter pumps. The gas engines were supplied by the Vivian Gas Engine Works of Vancouver, a fast growing concern in this territory, and the pumps are two-stage, centrifugal type, manufactured by Pump & Power, Ltd., of Vancouver. The vessel has a speed of 11 knots and her pumps supply water for fire fighting purposes at volumes and pressures said to compare favorably with all the latest fireboats built by various ports on the Atlantic and Pacific.

New Construction Bids.—The firm of Henry J. Gielow Co., Inc., 25 West 43rd Street, New York, is said to have prepared plans and specifications for the construction of a 120-ft. steel schooner yacht for which bids have been asked from shipyards.

This firm is also reported to have received bids from shipyards for the construction of a diesel towboat for the Ford Motor Company of Detroit to be 80 ft. long.

Reconditioning Loans Authorized.—The Shipping Board December 22 approved the application of the Waterman Steamship Corporation, a corporation of the State of Alabama, for loans from the construction loan fund, to be used in the remodeling, improving and equipping the steamships Afoundria, Maiden Creek, West Hika, and Topa Topa, a separate loan to be made on each vessel not to exceed three-fourths of the cost and not to exceed \$58,545.75 each on the Afoundria and Maiden Creek, and \$54,544.25 each on the West Hika and Topa Topa.

These vessels, on which the remodeling and improving is proposed, are part of the fleet which operates as the Mobile Oceanic Line, which was sold by the Shipping Board to the Waterman Steamship Corporation under sales agreement dated September 14, 1931.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of January 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W., Seattle, Wn.

Not named, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Bell St. Terminal, Seattle, for Alaska Service; 210 L.B.P., 41 molded beam; 21'6" molded depth, 16 loaded draft; 1500 H.P. McIntosh & Seymour diesel eng.; 14 knots speed; launch 1/18/32 est.

GENERAL ENGINEERING & DRY DOCK CO.,

Oakland, Calif.

Purchasing Agent: A Wanner.

Marshall C. Harris, hull 26, suction dredge for American Dredging Co., San Francisco, 150 L.B.P.; 45 beam, 12 depth; keel 11/23/31.

U. S. NAVY YARD,

Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30, deliver 4/1/33 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD,

Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement, keel 9/1/31.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP.,

Ltd., Union Plant

Drydock, clean paint, misc repairs: m/s Nora, La Placencia, Ernest H. Meyer, Hardanger, Admiral Peoples, Point Ancha, President Pierce, Maunalei, Lubrico, Pennsylvania, President Monroe, California, Frank G. Drum, Manukai, Sonoma, Malolo, m/s Alaska Standard, Admiral Moser, Hawaiian Standard, Richlube, Beulah, fireboat Dennis T. Sullivan, barges Santa Paul, State No. 4. Place tail shaft in engine room brackets and repair 2 sections whistle pipe; m/s Tamaha Braze copper pipe, etc.; stmr. Mowave. Repairs to armature; stmr. San Angelo. Elec. weld 2 vent trunks; stmr. Tejon. Misc engine repairs; m/s Otokia. Make and furnish 1 bronze intermediate ship valve disk; stmr. Trojan Star. Misc. repairs fish boats Geneva and New Monterey, m/s Adelles, launch Excellent, stmr. Guerrero, Limon, Saramacca, Point Sur, San Matro, Point Ancha, Suriname, President Coolidge, La Perla, stmr. schr. Esther Johnson, Vanguard.

LAKE WASHINGTON SHIPYARDS,

Seattle, Wn.

Remodeling and installing new diesel engine; Ferry Chippewa. Engine repairs; ferriesboats Olympic, Quilcene.

THE MOORE DRY DOCK COMPANY,

Oakland, Calif.

General alterations and install new engine; pilot yacht Zodiac. Drydock, repair hull barge Maltha. Drydock, clean, paint; Nordanger (also drew both tail shafts, rewood bearings, caulked and welded misc. rivets & seams), m/s Montanan (also misc boiler repairs), cutter Northland (also overhauled sea valves), Dauntless, Minnesotan (also drew tail shaft, rewooded bearings, caulked misc rivets and seam), stmr. Santa Teresa (also misc voyage repairs), tug Virgil G. Bogue (also drew tail shaft, other misc. repairs), stmr. Stuart Dollar (also misc. repairs), m/s Missourian (also voyage repairs). Drydock for survey; Saginaw, barge Yankee. Drydocked, cleaned, painted; Lake Frances.

PRINCE RUPERT DRYDOCK & SHIPYARD,

Prince Rupert, B. C.

Punched and brushed boiler tubes and cleared out back ends of combustion chambers; stmr. Canadian Seigneur. Misc hull and machinery repairs not requiring docking; 14 fishing boats. 31 commercial jobs.

U. S. NAVY YARD,

Bremerton, Wash.

Misc repairs and docking; West Virginia, Colorado, Dent, Roper. Misc repairs incidental to operation as district craft; Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS

Bath, Maine

Aletes, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launched 4/10/31; deliver 1/15/32 est.

Hull 148, twin screw, steel patrol boat for U. S. Coast Guard; 165 ft. long, diesel eng.; keel 5/6/31, launched 11/28/31, delivered 12/24/31.

Daphne, hull 149, same as above; keel 5/9/31; deliver 1/9/32 est.

Calypso, hull 150, same as above, keel 5/14/31; launch 1/27/32 est.; deliver 2/12/32 est.

Hermes, hull 151, same as above keel 5/20/31, delivered 3/9/32 est.

Hull 152, same as above; keel 7/22/31; deliver 4/3/32 est.

Perseus, hull 153, same as above. keel

9/15/31, deliver 4/28/32 est.

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy, 340 ft. long, 35 knots speed.

BETHLEHEM SHIPBUILDING

CORPORATION, FORE

RIVER PLANT,

Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/31 delivered 12/14/31.

Monterey, hull 1441, sister to above, launched 10/12/31.

Lurline, hull 1447, sister to above.

Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed, 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 11/28/31.

Quirigua, hull 1445, sister to above; launch 11/14/31 est.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORP., LTD.,

Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft., McIntosh & Seymour diesels, launched 11/5/31.

COLLINGWOOD SHIPYARDS, LTD.,

Collingwood, Ontario

Purchasing Agent: E. Podmore.

Wm. J. Stewart, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 m loaded speed, twin screw, TE engs; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.; keel 8/12/31.

Repairs: Bottom damage, tail shaft inspection, etc.; stmr. Windolite. Tail shaft inspection, etc.; stmr. Locolite. Bottom damage, tail shaft inspection, and sundry general repairs; stmr. Imperial, Gaisato.

DEFOE BOAT & MOTOR WORKS

Bay City, Michigan

Purchasing Agent: W. E. Whitehouse. Not named, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft, 15 M.P.H.; 960 D.W.T.; geared turbine 1500 S.H.P., 2 W.T. boilers; keel 12/15/31 est. launch 4/15/32 est. deliver 10/1/32 est.

DRAGO CONTRACTING COMPANY,

Pittsburgh, Pa., and Wilmington, Del.
Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; 29 delivered.

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hull 1134, one 24-in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6".

**DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa**

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

**FEDERAL SHIPBUILDING & DRY
DOCK COMPANY**

Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launch Feb./32 est.

Santa Paula, hull 122, sister to above; keel 8/4/31; launch Apr./32 est.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel Feb./32 est.

**HOWARD SHIPYARDS & DOCK
COMPANY,**

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Mark Twain, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launched 8/29/31, deliver 12/21/31 est.

Not named, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft.

MARIETTA MANUFACTURING CO.,

Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Five cargo barges for Inland Waterways Corp.; 230 x 45 x 11 ft.; 3 delivered.

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6".

Captain William Clark, same as above.

One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9".

**MIDLAND BARGE COMPANY,
Midland, Penn.**

Eight floating steel caissons for Foundation Co.; 6 delivered.

Two steel barges, for U. S. Government, 40 x 14 x 3'6".

**NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.**

Purchasing Agent, R. L. Baldwin.

Hull 260, dredge for stock; 140 x 36 x 9'; keel 11/16/31; launch 1/11/32 est.

**NEWPORT NEWS SHIPBUILDING &
DRYDOCK COMPANY**

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launched 8/15/31; delivered 12/12/31.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31.

Chiriqui, hull 346, sister to above; keel 4/27/31; launched 11/14/31; deliver 7/32 est.

Not named, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/32 est.; launch 8/32 est.; deliver 12/1/32 est.

Not named, hull 348, sister to above; keel 4/32 est.; launch 7/32 est.; deliver 12/15/32 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31; launched 1/9/32; deliver 5/32 est.

Acadia, hull 351, sister to above; keel 8/31/31; launch 2/32 est.; deliver 6/32 est.
Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO.

Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launched 12/5/31; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31.

SPEDDEN SHIPBUILDING CO.,

Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Walter Wyman, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor; keel 8/1/31; launched 11/5/31; deliver 3/1/32 est.

**SUN SHIPBUILDING & DRY DOCK
COMPANY,**

Chester, Penn.

Purchasing Agent: H. W. Scott.

Mercury Sun, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; deliver 12/15/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Not named, hull 146 single-screw steamship for carrying loaded railway cars for Seatrains Lines, Inc., New York and New Or-

leans; 464'6" by 63'6" by 38'3"; 15½ knots speed; 8500 D.W.T.

Not named, hull 147, sister to above.

UNITED DRY DOCKS, Inc.

Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launched 10/7/31; deliver 2/15/32 est.

Hull 806, barge for Berwind-White Coal Mine Co.; 130 L.O.A.; 35 beam; 12'6" depth; keel 12/28/31; launch and deliver 2/1/32 est.

Hull 807, scow for City of New York; 70 L.O.A.; 30 beam; 7'6" depth; keel 1/18/32 est.; launch and deliver 3/1/32 est.

Trade Notes

Opposes Navy Handling 50 Per Cent. of Construction. — Rear Admiral George H. Rock, chief of the Bureau of Construction and Repair of the United States Navy Department, is quoted by the United States Daily as opposed that section of (H.R. 6661), the Vinson Bill, (authorizing a 10-year naval construction program) providing that the work be divided equally between Navy Yards and private shipyards. At a hearing on that bill before the House Committee on Naval Affairs, Rear Admiral Rock is quoted as saying that, while he believes a certain amount of new construction work should be given to the navy yards, he believes the necessity for the upkeep of American private shipyards should compel the navy department to award to them all possible new construction work. Admiral Pratt advocates the early approval and authorization by Congress of a naval construction program in accordance with existing covenants in order that the technical staffs of shipyards may not be lost to other industries and as a much needed outlet for unemployment now existing among shipyard mechanics and other technicians connected with this industry.

Annual Report of Construction Work.—According to a release covering report on its marine construction activities during the year 1931, the Dravo Contracting Company of Pittsburgh, Pa., shows a total vessels launched during the year of 72 with a total gross tonnage of 33,365. In addition, there was under construction on January 1, six hulls totaling 5301 gross tons.



Marine Insurance

Edited by James A. Quinby

Inherent Vice

Damage Due to Nature of Goods not Recoverable Under Ordinary Marine Policy

YOU may find in any text-book on marine insurance a statement that insurance is designed to protect against things which are fortuitous in nature, things which may happen, not things which must happen. Arnould says "the underwriter is not liable for that loss or deterioration which arises solely from a principle of decay or corruption inherent in the subject insured, or, as the phrase is, from its proper vice, as when fruit becomes rotten, or flour heats, or wine turns sour, not from external damage, but entirely from internal decomposition."

Arnould then cites *Taylor vs. Dunbar*, an English case decided in 1869, holding that where meat shipped at Hamburg became putrid through delay on the voyage, occasioned by tempestuous weather, and was necessarily thrown into the sea, there was no loss within the meaning of the marine policy. In cases like *Taylor vs. Dunbar*, the theory of proximate cause is employed to show that the real, efficient cause of the loss of perishable goods is the nature of the goods themselves. Canned goods, for example, would not suffer deterioration from the prolongation of the voyage. And if goods suffer from their own defects or weakness, the result is inevitable and is not one of those fortuitous events against which a marine policy is designed to protect.

There is no doubt that the doctrine of proximate cause is often strained to an absurd degree. In the English case of *Pink vs. Fleming*, for example, reported at VI Aspinall 554, a shipment of oranges and lemons was necessarily discharged and reloaded as a result of a collision. The court held that the collision was not the proximate cause of damage due to such forced handling and denied recovery under the cargo policy, relying upon *Taylor vs. Dunbar*. At this distance, however, it would seem that a valid distinction could be made between the two cases, inasmuch as any type of cargo might well have been damaged by forced handling, which in *Pink vs. Fleming*, was certainly a natural result of the collision.

Of course, it must be realized that inherent vice can be insured against, provided the policy specifically sets forth the particular kind of damage involved. It is only the ordinary marine policy to which our present discussion refers. As to such a policy, we find the fol-

Anathema

I hate Cornelius R. McDuff
I hate his bright blue eye
I hate his walk, I hate his talk
I hate his purple tie,
For I write cargo policies
And he writes P & I
J A Q

lowing statement in 38 Corpus Juris 1096-7:

"Underwriters are only liable for such losses or damages as are occasioned by some one of the perils enumerated in the policy . . . Nor is the insurer liable for losses resulting from inherent vice, defect, or infirmity of the subject matter insured, or for mortality of or injury to animals, . . . not directly traceable to the action of a sea peril or other risk insured."

This doctrine was extended by the Supreme Court of Minnesota to apply to an all-risk jewelry policy in *Chute vs. North River Insurance Co.*, 1927 A.M.C. 1285. In that case the policy covered all risks of loss

or damage caused by breakage, fire, and theft. An opal covered by the insurance became cracked during the currency of the policy, and suit was filed to recover for the damage. The attorney for the assured, with commendable but hardly sagacious candor, stated in his complaint that the crack "was due to an inherent vice in said opal and was not the result of outside force." In holding that the damage was not covered, the court made the following lucid comment:

"Plaintiff purchased and defendant furnished indemnity against loss or damage from fortuitous and extraneous circumstances rather than warranty of the quality and durability of chattels. It takes explicit language indicating that purpose to extend the effect of insurance beyond damage arising from or contributed to by extraneous causes and make it cover loss from automatic deterioration alone."

The general applicability of the doctrine to marine insurance is recognized in *Perry vs. Cobb*, 88 Me. 435, cited by Joyce in his "Law of Insurance," Vol. IV, Par. 2799. In that case, due to the protracted length of the voyage as a result of rough weather, a cargo of lime in barrels became damaged through the gradual drying of the barrel-staves, which allowed the coo-perage to become loose and the lime to sift out. The court denied recovery under the policy, holding that the loss was due to the nature of the goods rather than to any sea peril.

The Corsicana Case

While American courts generally recognize the general principle that inherent vice or decay induced by

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delay cannot support a claim under a marine policy, there is one notable case to the contrary, *The Corsicana*, 1924 A.M.C. 365, a decision by the New York Appellate Division, later affirmed without comment.

In that case a ship carrying a cargo of potatoes, owned by the plaintiff and insured by the defendants, struck a submerged object and was so damaged that she was obliged to put in to Charleston, South Carolina, for repairs. During the delay for repairs, the potatoes, although not directly injured by the accident, were necessarily sold in a deteriorated condition due to sprouting and rot. Impressed by the argument that the cargo would have arrived sound had it not been for the accident, the New York State court held that the damage was a result of a sea peril, and allowed recovery under the policy.

Under the theory of *Taylor vs. Dunbar* and other leading English cases, the *Corsicana* decision is hard to sustain. It is probable that neither underwriter nor assured, when the policy was issued, contemplated coverage of deterioration caused by delay. While there is a peculiar dearth of authority on the subject, it is extremely doubtful if the *Corsicana* case will be accorded any great weight in the future. In fact, the United States District Court in New York indirectly cast aspersions on the doctrine of the *Corsicana* in *Hills Brothers Co. v. United States*, 1930 A.M.C. 623. In that case, the steamer *Casey* struck a rock in the Mediterranean and put in to Malta for repairs. The delay incidental to repairs was so great that a shipment of figs owned by Hills Brothers Company became rotten. A general average adjustment was drawn up, in which the adjusters refused to allow the damage to the figs as general average. The matter was litigated, and the court held that the decay of the figs was due to their nature, and was not proximately caused by the accident, and therefore upheld the adjusters' position.

The cases are not reconcilable on the facts. If delay after an accident made that accident the cause of the loss in the *Corsicana*, it should also make the accident the proximate cause of the loss in the *Casey*. As between the two, the *Casey*, while it is a case in general average rather than under a cargo policy, seems more in accord with logic and with the generally accepted view on the subject.

It may be concluded, therefore, that the only safe way to protect cargo against deterioration is to insure it against deterioration and pay the additional premium which such coverage entails.

Fraudulent Over-Valuation Voids Policy

AN assured under a hull policy has recently been denied the right to recover for a total loss on grounds which are fortunately rare. (*The Greyhound*: King vs. Aetna Insurance Co., 1931 A.M.C. 1940).

The assured purchased the yacht *Greyhound* for \$2500, laid her up afloat at a Long Island port, and took out an Aetna port risk policy for \$10,000 on an agreed valuation of \$40,000. One week after the policy was issued, the yacht dragged her anchors, stranded on the beach, and burned up. In a suit to recover under the policy, the underwriters contended:

1. That the assured had fraudulently misrepresented the value of the vessel,
2. That her anchors were insufficient, and she was never safely moored, and
3. That the assured had intentionally burned the vessel to collect the insurance.

The case was removed from the New York state courts to the Federal District court, which ruled out the first and second defenses, leaving the third to a jury, which returned a verdict for the assured for the full \$10,000 with interest and costs. Upon appeal to the Circuit Court of Appeals, the decision was reversed on the ground that all three defenses should have been left to the jury, and particularly upon the ground that the overvaluation was a material point constituting misrepresentation which operated to permit the underwriter to consider the policy void. Upon appeal, Justice Swan comments as follows on the over-valuation:

"It is a well recognized rule of marine insurance, which we have recently had occasion to consider in *Btsh vs. Royal Ins. Co.*, 1931 A.M.C. 1044, 49 F (2d) 720, that the insured is obliged voluntarily to disclose to the insurer all circumstances known to him and unknown to the insurer which materially affect the risk, and that a failure to make such disclosure will vitiate the policy. The authorities were cited in the *Btsh* case and need not be here repeated. As there stated, the books are somewhat vague as to how far the insured shall be charged at his peril with appreciating the materiality of a fact which he knows and fails to disclose; but that problem does not arise here, for St. John was informed on September 23 by Mr. Billing of the Vessel Agency that he must ascertain what King paid for the boat and when St. John reported that King would not say, he was told by Billing that the Vessel Agency would not place the insurance.

If this information was material to the Vessel Agency, St. John must have appreciated that it would be

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GEORGE JORDAN, Manager
ATLANTIC MARINE DEPARTMENT
116 JOHN STREET NEW YORK

09 COLMAN BUILDING, SEATTLE, WASHINGTON.

equally material to the appellant. Indeed, regardless of St. John's conversation with Billing, we think any reasonable person must know that the fact that the vessel has just been purchased for \$2500 would materially affect the decision of an underwriter about to issue a \$40,000 valued policy upon her. It is held that concealment of an over-valuation so excessive as to make the risk speculative vitiates the policy. *Ionides vs. Pender*, L.R., 9 Q. B. 531; *Thames & Mersey Marine Ins. Co. vs. Gunford Ship Co.*, L. R. (1911) A. C. 529. The valuation of a vessel at sixteen times what she had just cost the insured likewise makes the risk speculative; the insured has less incentive to protect her than he would had he paid a sum somewhere near commensurate with the stated value.

While ordinarily the materiality of the concealment is a fact for the jury, *Muller vs. Globe & Rutgers Fire Ins. Co.*, 246 Fed. 759 (2 C.C.A.), the evidence in the case at bar was so clear that we think the Court should have held the policy vitiated and have granted a motion to dismiss the complaint. The first separate defense pleaded that the insured purchased the boat for \$2500, that this was her true value, and that such true value was concealed. This would seem a sufficient allegation of concealment of the purchase price, but if not, it could have been amended to conform to the proof."

Cargo Damage from Ship's Toilet Lines

IN the past few years, American courts have had to deal with several cases involving damage to cargo caused by the defective condition or breakage of soil discharge lines on shipboard. From the viewpoint of a cargo underwriter, it must be confessed that such damage is not due to a peril of the sea, and the ordinary marine policy does not usually cover it. From motives of policy and fair dealing, however, cargo insurers, have, in certain cases, paid these claims and proceeded against the vessel owner, under subrogation, to recoup their loss.

If the damage is due to pipes or fittings which are shown to have been defective at the time of sailing, and not to the intervening act of some member of the crew, the vessel is clearly liable. If the damage is directly traceable to the act of a crew-member in poking a hole in an otherwise seaworthy pipe, it appears that the proximate cause of the loss is an act in the management of the vessel, for which the owners contend they are exempted under the Harter Act.

In *The Culberson*, 1931 A.M.C. 1987, a toilet above

No. 5 hold became stopped up during the voyage, and a member of the crew was instructed to clear it. This he proceeded to do by using an iron bar, which quite naturally poked a hole in the lead pipe of the toilet line, allowing sea-water under 15 pounds pressure to flow into the cargo hold during the rest of the voyage. The United States District Court (Massachusetts) held this to be an error in the management of the vessel, specifically pointing out that the toilet was shown to have been in good shape when the voyage began.

Many Pacific Coast cargo owners and underwriters are involved in a suit now pending in New York against the owners of the *J. L. Luckenbach* upon facts somewhat similar to those in the *Culberson* case. As the cargo damage in the *Luckenbach* case exceeds \$40,000, it will doubtless be litigated to a conclusion. The case differs from the *Culberson* case in that cargo interests contend that the *Luckenbach* steamer started on her voyage with the toilet stopped up, and a member of the crew later attempted to clear it, and in so doing, poked a hole in the line.

Mixed Cargo

In the report of *Lloyd Sabauda, etc., vs. Philip Elting*, 1931 A.M.C. 1787, we find the following headnote:

"Whether a hairdresser is a bona fide member of the crew held a question of fact requiring trial, and not to be disposed of on motion."

Avast there, mate. Turn out the dressmaker, the manicurist, and a couple of ladies maids to man the captain's gig!

The study class of the San Francisco Association of Marine Underwriters has been hammering along under a full head of steam, and is now well into its eleventh annual term. At the meeting of December 14, 1931, the underwriters listened to two capable and interesting speakers.

Wilfred Page, the genial skipper of *Geo. E. Billings Company's* adjusting department, delivered a short talk on the fundamentals of general average, pointing out the essentials of a general average act, and the manner in which the contributions are levied upon the interests involved. The second speaker was James Scott, surveyor for the Board of Marine Underwriters of San Francisco, who discussed and described the purpose and operation of refrigerating apparatus on modern cargo vessels. Mr. Scott's remarks were of timely interest, in view of recent difficulties with refrigerated

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One upon a time there was an attorney who lost a Case for an Underwriter. He asked for a Big Fee, pointing out with Tears in his Eyes how much Work he had done. But the Underwriter said NO—We demand results. And so, when the Same Attorney later won a case for the Same Underwriter, he asked an even Bigger Fee, pointing with pride to the Results, but the Underwriter said NO—you worked only Two Weeks on the case and a Laborer is only Worthy of his Hire. And the Worst of it is that they are Both Right.

Ho, Hum . . . Reinsurance makes strange bedfellows.

Algy Best says a shipment of dippers recently arrived at San Pedro after a delay caused by a marine peril on the voyage, and the consignee refused to accept delivery, on the ground that the goods were affected by a seasonal demand, and the season was past.

Whoopie! Spring has come—and gone—in Los Angeles.

The claims service of the Fireman's Fund Indemnity Company and the Occidental Indemnity Company is to be augmented by the establishment of a regional claims adjustment office, 408 California State Life Building in Sacramento, California, which will be under the direction of Homer H. Mathews, resident adjuster.

With the opening of this office

in Sacramento, Fireman's Fund officials point out that the companies' claim service for the policyholders and agents of North Central California will be handled with facility and dispatch.

Mathews, who has been engaged in claims work several years, the last two of which as a member of the staff of the Fireman's Fund Group, goes into his new field well qualified and experienced in the adjustment of automobile and casualty claims. He will handle claims for both Fireman's Fund and Occidental Indemnity Companies.

Trade Notes

John Hinds Promoted. — John Hinds, long favorably known to Pacific Marine Field, as manager of Westinghouse Steam Service Superintendent for San Francisco area, has been made steam service manager for the Pacific Coast District. John's friends are delighted, Westinghouse well pleased.

Port of Oakland Compass is the title of a new house organ just inaugurated by The Board of Port Commissioners, Oakland, California. It is to be published monthly and is edited by Hal Wiltermood.

The first issue gives promise of a house organ which will compare favorably with any that comes across our desk. It is of small size, but contains some fine articles on shipping and industries contributing to the Port of Oakland, written by leading citizens, an interesting "President's Page," and many fine illustrations. If you are interested in receiving this little monthly paper, drop a line to the editorial department of this magazine, or address the Board of Port Commissioners at Oakland, California.

Feature Oxwelded Piping. — At the International Heating and Ventilating Exposition, Cleveland, last month, The Linde Air Products Company exhibited the wide variety of applications of oxy-acetylene welding and cutting in the heating and ventilating industries, typical welded specimens of steel pipe, brass tubing, bronze pipe, and cast iron sewer pipe. The latest type of

Oxweld welding and cutting equipment including the Type W-17 Welding Blowpipe and Type CW 17 Cutting Attachment were displayed, as well as carbide acetylene generators, Linde oxygen, Prest-O-Lite dissolved acetylene, and Union Carbide. The feature of the exhibit was the actual pulling and bending of welded pipe sections in tensile and bend testing machines to show graphically the strength of oxy-acetylene welded joints.

Trade Literature

Electric Furnaces. This is the title of a very interesting little booklet published by the General Electric Company, Schenectady, New York, for the information and guidance of manufacturers who are ever striving to equip their plants with the most modern and economical equipment to meet competition. The booklet is well illustrated. Copies may be obtained either from the company direct or by addressing the Editorial Department of this magazine.

Frigidaire Aboard Yacht & Pleasure Craft. This booklet, very nicely illustrated and printed, shows the application of the refrigerator units and systems to recent American yachts and cruisers, particularly those equipped for long voyages. The booklet may be obtained either through the Editorial Department of this magazine or from Frigidaire Corporation at Dayton or any of its branches.

A New Process of Metallizing is described in a leaflet issued by the Metallizing Company of Los Angeles, Ltd. This process is recommended for stopping corrosion of metal parts and metal vessels, tanks, etc., for decorative metal coating, and similar work. Copy may be had by addressing the editorial department of this magazine.

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Trade Notes

Pacific Coast Expansion of Waterbury.—An announcement of interest to the Pacific Coast marine industry is that of the expansion of western activity on part of the Waterbury Company of New York, manufacturer of a complete line of manila rope products.

Founded in 1816, and for thirty years active in the Pacific territory, having maintained a separate factory branch in San Francisco for about twenty-five years, Waterbury Company announces an improved product especially developed for the shipping trade, and has appointed The Haviside Company as Northern California distributor.

G. F. Waterbury, president of the firm and the fourth generation to engage in its affairs, recently completed a tour of Pacific Coast ports, and while in the Bay territory made the Haviside appointment, with Warren Taylor acting as direct factory representative. The Waterbury-Haviside sales and service alliance marks a joining of two pioneer organizations in their particular field. The Haviside name has been prominent in western shipping activity for fifty years,—three generations of this family having been active in the business.

In the Los Angeles Harbor district, Waterbury Company has appointed the San Pedro Rubber & Supply Company as marine distributors. Joseph M. Costello, popular and widely known marine engineer, has just joined this firm and will look after Waterbury business along with the other lines. "Joe" Costello served as marine engineer aboard vessels of the old Pacific Mail Steamship Company, McCormick Lines, and was with the Standard Oil Company of New York.

It is interesting to note that one of the members of the Waterbury family figured prominently in the early history of San Francisco in the gold rush. In the days of '49 he arrived within the Golden Gate on the historic ship Albany, later to become a member of the Vigilantes, and was appointed sheriff of San Francisco.

R.C.A. Equipment Orders.—Charles J. Pannill, executive vice-president of the Radiomarine Corporation of America, announced last month that orders have been received by the Radiomarine Cor-

poration for the equipment of eight new vessels with radio telegraph and direction finder apparatus. Four of the installations will be on vessels of the United Fruit Company which are to be launched during the present year. Orders for the same type of equipment have been received for two new vessels of the Eastern Steamship Company, and for the two ships of the Colombian Steamship Line which are to be launched at Newport News this year.

The Radiomarine Corporation, which supplied complete radio equipment for the first of the Matson Navigation Company's new ships, the *Marinosa*, also has on hand orders for the same type of equipment for the two sister ships, described in another section of this issue.

Radio System at Sea. — Mackay Radio and Telegraph Company has recently taken over the radio communication service on the twelve ships of the Clyde-Mallory line fleet. These vessels are the *Shawnee*, *Iriquois*, *Seminole*, *Algonquin*, *Mohawk*, *Cherokee*, *Henry R. Mallory*, *Brazos*, *Pecos*, *Medina*, *Comal*, and *Agwidale*. The first seven of these are well known passenger ships operating in the coastwise service; the last five are freight ships operating in coastwise traffic and touching the Gulf ports. The acquisition of this line by Mackay Radio extends still further the International System on the high seas, each passenger vessel being in effect a floating telegraph office.

New Baker Sales Engineers. — Two new faces make their appearance among the group of Baker Engineers; both are faces of successful materials handling men who have been selected to give to truck users the full value of their exceptional knowledge and experience. These men have a thorough knowledge of materials handling operations and the part that trucks, tractors, or crane trucks can have in expediting or cheapening handling costs in comparison with other methods.

Mr. Witte is president of the company which bears his name—the Frank E. Witte Co. of 1061 Howard

Street, San Francisco. This company will carry a complete stock of repair parts as well as some standard models of trucks. Mr. Witte has been identified with materials handling operations in the San Francisco area for the past eight years.

For ten years the operators of the lumber and paper mills and industrial plants of the Pacific Northwest have known H. S. Fuller and consulted with him on their materials handling operations. Under the leadership of Mr. Fuller, the industrial truck will attain its rightful and legitimate place in materials handling operations in the Northwest. The office of Mr. Fuller is at 810 Terminal Sales Building, Seattle.

New Oil Refinery in Japan.—The new refinery built by the Associated Oil Company of California and the Mitsubishi Oil Company, Ltd., at a cost of \$2,000,000 has been put into operation. The plant is located on Tokyo Bay between Tokyo and Yokohama, with headquarters in Tokyo, and will supply gasoline, distillates, lubricating oil, and fuel oil to Japan, Korea, Formosa, and other points in the Orient. It has a capacity of 4000 barrels of crude a day.

Publicity Manager. — According to an announcement by the General Electric Company, Chester H. Lang, formerly assistant manager of the publicity department and then comptroller of the budget, has been appointed manager of publicity department to succeed Martin P. Rice who retired December 31, after more than 37 years of service. Mr. Lang was graduated from the University of Michigan in 1915 and entered the service of the General Electric Company in 1919 as traveling auditor. He served later as assistant manager of the publication bureau, later with the publicity department, then as comptroller of the budget.

The Motorizer is a new trade interest leaflet inaugurated by The Lincoln Electric Company, P. O. Box 683, Cleveland, Ohio, in response to numerous requests from users of its products for information as to up-to-the minute information on motors and controls. Questions are solicited, and they will be answered in *The Motorizer*.

Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER

Elect 1932 officers. Pacific American Steamship Association's annual election resulted in re-election of all officers and directors.

Officers:

Robert Dollar, honorary president
J. C. Rohlf, president
R. D. Lapham, vice-president
R. J. Chandler, vice-president
Hugh Gallagher, vice-president
J. P. Williams, secretary.

Directors:

Robert Dollar
J. C. Rohlf
R. D. Lapham
R. J. Chandler
Hugh Gallagher
Wm. Groundwater
M. J. Wright
G. D. Zeh.

Sperry. J. F. McConkey, West Coast manager of the Sperry Gyroscope Company, recently returned to his San Francisco headquarters after a three months trip into the Canadian field and eastern states. He visited the factory at Brooklyn, and returned to the Pacific Coast via New Orleans. McConkey has now continued his journeys by visiting all marine points in the Northwest. Through his eastern territory observation McConkey reported an encouraging outlook for the American marine construction field.

Visitor from East. A recent visitor to the San Francisco Bay maritime circles was J. B. Denison, retired vice president of the Clyde-Mallory Lines of New York. He came out to San Francisco through the Canal on a recent voyage of the Panama Mail liner Santa Ana, his first visit to the Coast since 1886. When asked about his opinion of shipping and conditions in general, Denison replied that inasmuch as shipping is world-wide, world conditions must improve before there is an improvement noted in maritime activities. He said he believed he was able to observe an upward trend in business throughout the United States.



John C. Rohlf of San Francisco, just re-elected President of the Pacific American Steamship Association.

Boat industries. The Associated Boat Industries of California, formed three years ago for the development of boating—sailing and motor—on California waters, held its annual election and banquet last month at San Francisco. Charles S. Tripler retired as president and his



Well known throughout the marine world as vice-president of the Radio Corporation of America, G. Harold Porter was last month elected President of the Commercial Club of San Francisco.

place was taken by Mott Q. Brunton. Tripler was presented with a portable radio set in appreciation of his services as president since the organization of the association. Other officers elected were: J. G. Rapp, first vice-president; W. Freeman Burbank, second vice-president; F. B. Delano, treasurer; and Frederick Weddleton, secretary. This organization has sponsored the Pacific Coast Motorboat Show, held each spring at the Exposition Auditorium, San Francisco, and has done much to promote pleasure boating on the Pacific Coast. Plans for its 1932 campaign are now being formulated.

Safety committee. A citizens committee, charged with the survey of the San Francisco waterfront to propose measures for greater safety, was held January 12 at the office of the Board of State Harbor Commissioners in the Ferry Building. In attendance were: Captain N. J. Kane, port captain of the American-Hawaiian Steamship Company and representative of Thos. G. Plant, operating manager of the company; Wm. H. Crawford, industrial department manager of the San Francisco Chamber of Commerce; Sergeant Lawrence McInerney of the San Francisco Police Department Traffic Bureau; Charles Leminger; and Dr. W. E. Parker, Jr. Dr. Parker was appointed chairman and Mr. Crawford secretary. The investigation will include the entire waterfront, beginning at Fisherman's Wharf on west end and extending along the entire Embarcadero; and recommendations will be made to the Harbor Board at the earliest possible moment as to what steps may be taken to improve safety in the handling of traffic.

To retire. After nearly thirty-nine years service in the United States Navy, Captain D. E. Theleen, in charge of the San Francisco Hydrographic Survey Office, is scheduled to retire soon. It is reported that his place will be taken by Captain H. E. Lackey, now in command of the U.S.S. California.

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Ship.	Eastbound		Westbound	
	Leave	Arrive	Leave	Arrive
	San Francisco	Los Angeles	New York	San Francisco
Santa Monica††	Feb. 8	Feb. 10	Jan. 22	Feb. 15
*Santa Cecilia	Feb. 19	Feb. 20	Feb. 5	Feb. 29
Santa Ana†	Mar. 4	Mar. 5	Feb. 16	Mar. 6
Santa Catalina‡	Mar. 8	Mar. 10	Feb. 19	Mar. 14

Ship	Eastbound		Westbound	
	Leave	Arrive	Leave	Arrive
	New York	Cristobal	San Francisco	Los Angeles
*Santa Cecilia	Jan. 22	Jan. 31	Jan. 22	Feb. 15
Santa Ana†	Feb. 5	Feb. 14	Feb. 5	Feb. 29
Santa Catalina‡	Feb. 16	Feb. 16	Feb. 16	Mar. 6
*Santa Elka	Feb. 19	Feb. 28	Feb. 19	Mar. 14

*Ports of call—Mexico: Acapulco (north), Champerico, San Jose de Guatemala, Acajutla, La Libertad, La Union, Ampala, Corinto, San Juan del Sur, Puntarenas, Balboa, Cristobal, (Buenaventura via Balboa).

†Refrigerator space.
*Ports of call—Acapulco, San Jose de Guatemala, Acajutla, La Libertad, Corinto, Puntarenas, Costa Rica, Balboa, Cristobal, Cartagena, Puerto Colombia, Havana (East-bound only), and New York.

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On his graduation from Annapolis, Captain Theleen served at sea aboard the old cruiser *Marblehead*. He was aboard the Massachusetts during the Spanish-American War. During the World War he was acting Captain, and was appointed Captain in 1921.

During the time he has been at the Hydrographic Office, Captain Theleen has won for himself a place of esteem and affection among the naval personnel and among the maritime fraternity. His unflinching courtesy and willingness to extend to mariners the benefit of the great store of information contained in the Hydrographic Office made him truly of great boon to the shipping industry.

Captain Theleen says that he has not yet planned what he will do on his retirement. He may take a long voyage as passenger, or simply retire to his "peninsula" home for a long shore leave.

Earned rest. After thirty years' service in San Francisco, W. W. Smith, district freight agent of the Canadian Pacific Railway has retired. Smith entered the service of the American Express Company at Toronto, Canada, in 1881, went later to Chicago, and in March, 1893, joined the Union Pacific forces at San Francisco. He returned to Canada as freight clerk for the Canadian Pacific in 1892, but the next year brought him again to San Francisco to open a freight soliciting office for the Canadian road. During the years Mr. Smith has seen the export of California products over the Canadian Pacific grow from a few cases of fruit to thousands of carloads each year.

Smith plans to spend his winters in San Francisco, but will go north to his native land during the warmer months. He is succeeded at San Francisco by D. A. MacDonald, who has been travelling freight agent for the Canadian Pacific at Seattle.

Important visitor. Kermit Roosevelt, president of the Roosevelt Steamship Company, operating the United States Lines and American Merchant Lines, visited San Francisco last month on a trip of combined business and pleasure.

While in San Francisco, Roosevelt called on J. Harold Dollar, Herbert Fleischacker, and Wm. H. Humphrey, president of the Associated Oil Company, who are associated with him in the United States Lines Company. Later he

NEWS BULLETIN

S. S. MARIPOSA

En Route, Boston to New York Sunday January 16, 1932

We begin our news bulletin on this day, presenting Mr. H. W. H. who has sailed before, and has a very good opinion of the ship. You may be sure a great number of people will be in good luck. Mr. H. W. H. and Mr. W. H. W. will give the first trip in three. It is a very good trip and should give a very good trip. Mr. H. W. H. and Mr. W. H. W. will give the first trip in three. It is a very good trip and should give a very good trip.

We cannot but mention the good service to the ship which is a very good service. The ship is a very good ship and should give a very good trip. Mr. H. W. H. and Mr. W. H. W. will give the first trip in three. It is a very good trip and should give a very good trip.

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On the trip from Boston to New York, the printing press on the S.S. Mariposa turned out its first "news" for passengers.

went to Los Angeles to meet Kenneth Dawson of Portland, another of his associates in the same company, with whom he planned his fishing trip after marlin and sword fish.

In San Francisco Roosevelt gave out the following statement for publication:

"While I am here primarily for a fishing trip, I shall also see our western partners in the United States Lines company, for a general discussion of the progress that has been made since the change in management of the United States Lines and American Merchant Lines. The transfer of management to the Roosevelt Steamship Co. as general agent has now been fully carried out, and everything is moving smoothly in the management of the two lines.

"Business is picking up for the less expensive types of tonnage at present. Expensive ships of the Leviathan type are at a discount at this time of year, which is the usual period for annual lay-up of the express liners. The Leviathan's lay-up is nothing unusual. The other companies also lay off their monster ships in winter. For our smaller ships, of the American Merchant Lines and the Baltimore Mail

Line, with moderate fares, business is good for this time of year and we anticipate a good season for the spring and summer of 1932."

Asked for his views on the present trend of business in the intercoastal trade on behalf of the Panama Pacific Line, Mr. Roosevelt said:

"We are all watching the progress of the present bill before Congress to regulate intercoastal rates, in the same manner that the Interstate Commerce Commission regulates rail rates. We believe the bill is a good one. Self-regulation has been tried by the carriers for years, but in spite of the earnest efforts of the leading lines to bring order to the trade, the small and irresponsible operator and the proprietary carrier cannot be controlled. Therefore it seems that government regulation is the only solution that will give stability and a proper rate level, enabling the leading lines in the trade such as ours to give the service demanded by shippers and the traveling public."

American cavaliere. Harry S. Scott, well known ship operator of San Francisco, who heads the General Steamship Company and lists among his agencies many of the most important companies of Europe, has been signally honored by King Vittorio Emanuele of Italy. At a recent ceremonial held at the Bohemian Club in San Francisco, Lodovico Manzini, Consul General at San Francisco for the Italian Government, in behalf of his king, tendered to Mr. Scott the decoration of Cavaliere Ordini Della Corona d'Italia, in recognition of his services in developing trade between the Pacific Coast and Italy.

The presentation was made at a luncheon in honor of Captain Mario Taddei, director-general of the Libera Line, a visitor to San Francisco, which was attended by more than fifty civic, business, and steamship leaders of San Francisco.

Abe Marks. The present severe winter on the Pacific Coast has caused considerable confusion in shipping and sometimes delays. Chief Abe Marks of the San Francisco Marine Exchange has issued a reminder to all mariners that a telephone message put through to the Marine Exchange of the San Francisco Chamber of Commerce will result in up-to-the-minute report on weather conditions anywhere on the coast or anywhere on



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Atlantic - Far East

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Trans-Pacific Freight Service

TRI-MONTHLY SAILINGS between Los Angeles Harbor, San Francisco, Pearl Harbor, Guam, Manila, Cavite, Iloilo, Cebu and other ports as inducement offers.

Intercoastal

WEEKLY SAILINGS from New York, FORTNIGHTLY from Boston to Los Angeles Harbor and San Francisco. FORTNIGHTLY SAILINGS from San Francisco and Los Angeles Harbor to New York. Cargo destined or shipped from Oakland, Portland, Seattle or Vancouver subject to San Francisco transshipment.

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Captain A. Skjellerup is now in command of the Matson-Oceanic liner Sonoma. He is a lieutenant-commander in the U. S. Naval Reserve, and has served on several O. & O. freighters to Australia and New Zealand.

the Pacific. The United States Weather Bureau is also located in the Merchants Exchange Building and the Marine Exchange is constantly on the alert to extend all such service to aid the dispatch of ships at the Port of San Francisco.

Carstairs on Manhattan. Following the launching of the Steamship Manhattan at the yard of the New York Shipbuilding Company, on December 5, it was announced by the United States Lines that Chief John Carstairs has been assigned to the responsible post of standing-by during the installation of propulsion machinery in the vessel. Chief Carstairs supervised, for the owners, the installing of propulsion machinery in the passenger liners California, Virginia, and Pennsylvania of the Panama Pacific Line, and since the inauguration of the Pennsylvania has been serving as chief on that vessel.

John Carstairs is probably the leading authority among the marine engineers of the United States in the practical application of the turbo-electric system to ship propulsion; and with him on the job, the trials and maiden voyage of the Steamship Manhattan are assured of success.

Seattle appointment. The Panama Mail Service of the Grace Lines, Inc., has announced the appointment of W. D. Vanderbilt as general passenger agent at Seattle, with jurisdiction over Washington, Oregon, Alaska, and British Columbia. The announcement was made

recently by William A. Young, Jr., general passenger traffic manager at San Francisco. Mr. Vanderbilt, who is in charge of both the freight and passenger business of the Grace West Coast Line and the Panama Mail Service, will name a district passenger agent. Offices of the company are in the Hoge Building.

Famous skipper. Captain George Fried, hero of thrilling rescues in the stormy Atlantic, has been named commander of the new United States Lines North Atlantic liner Manhattan, recently launched by the New York Shipbuilding Company. The Manhattan is a 30,000-ton ship, 765 feet long, and will be a fine vessel with a worthy commander. Captain Fried was born in Worcester, Massachusetts, of Norse descent, and spent his boyhood on a farm. He enlisted in the United States Army during the Spanish-American War, afterwards joining the Navy, serving there until 1916 when he transferred to the merchant marine as third officer of the Solace. He returned to the naval service during America's participation in the World War, remaining in the Navy until 1921. On his return to the merchant marine, Fried was appointed chief officer of the United States Liner President Grant, then to a similar position on the steamship America, and then in 1922 he was promoted to captain of the steamship President Roosevelt. Captain Fried and the crews of vessels under his command figured in three important rescues of North Atlantic wreck victims. He commanded the Leviathan for three voyages, and has been acting as Port Captain for the United States Lines pending completion of the steamship Manhattan.

OBITUARY

Captain McAllister Succumbs. It is with sorrow that we learn of the death on January 6 of Captain Charles A. McAllister. As president of the American Bureau of Shipping, Captain McAllister was considered a world authority on ship construction and marine engineering; and he exerted his talents for the betterment of conditions relating to shipbuilding and operation. Captain McAllister was personally well known on the Pacific Coast, where he visited from



Also in the Australia Service is Captain Charles L. Brocas of the Matson-Oceanic liner Sierra. He was formerly with the Steamship Maunawili and chief officer of the Wilhelmina, and other Matson vessels.

time to time and had many friends among the ship operators.

William H. Thornley. Dean of San Francisco customs brokers and senior member of the pioneer firm of Thornley & Pitt, William H. Thornley, aged 75, died at his home at Los Altos on January 6. Mr. Thornley retired from active work four years ago.

Captain H. L. Roberson. Following only a week's illness, Captain H. L. Roberson passed away at Victoria, British Columbia, January 8. Captain Roberson was well known to mariners as pilot, under the British Columbia Pilotage Authority, for deepsea vessels plying in and out of British Columbia ports. For 23 years prior to this, except for the interval of the World War, he served with various vessels in the coastwise trade under the flags of the G.T.P. and the C. N.R. He was born in Hertford, England, 55 years ago.

Lucius C. (Bob) Roberts. One of San Francisco's best known waterfront reporters—Bob Roberts—died of heart failure January 21 at his home. He had been marine reporter on the San Francisco Chronicle for seven years. Coming originally from Alabama, where he was born forty-seven years ago, Roberts served for a time as editor of the Marysville Appeal. He is survived by his widow and will long be remembered by his friends and associates in the marine world.

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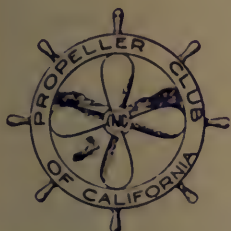
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Official News of the PROPELLER CLUB of California



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WITH 250 members in attendance, the annual meeting of the Propeller Club of California was held January 19 in the California Room of the San Francisco Commercial Club. The election of officers for 1932 was the main business of the day, and the meeting developed a valuable discussion of general plans and activities for ensuing months.

Our new president is James A. Cronin, superintending engineer and naval architect of the Standard Oil Company (Calif.), succeeding Ralph W. Myers, who has been president of the club for the past two years and under whose guiding hand the organization now lists close to 500 members.

Elected to our Board of Governors, roster of which heads this page, are William C. Empey, Bernard Mills, and Robert E. Christy. These governors succeed Frank Fox, Captain A. T. Hunter, and William Macdonald, whose terms expired. Captain Stanley E. Allen was reappointed secretary-treasurer. Retiring President Myers, Captain Allen, and ex-governors Fox, Hunter, and Macdonald, were given a rousing round of applause for their efforts and energy in interest of Propeller affairs.

As its new president, "Jim" Cronin, let us look at his career afloat and ashore. His first marine experience came with service as an oiler in the historic U.S.A.T. Sheridan, and he continued with transport

duty for five years until he was named third assistant engineer in the U.S.A.T. Dix. Later he entered the merchant service as third assistant on the steamer Jefferson of the Alaska Steamship Company.

In 1908, Cronin joined the Standard Oil Company as third assistant on the tanker Ascuncion, later to become first assistant in the Drake. He gained chief license in July, 1912, returning as chief to the Ascuncion. Cronin then served as chief engineer in the tankers Drake, Lucas, El Segundo, Richmond, J. A. Moffett, and W. S. Rheem. In the fall of 1918 he was appointed superintending engineer and naval architect for Standard of California, under John C. Rohlf, manager of the marine department.

— PC —



James A. Cronin succeeds Ralph W. Myers as president of the Propeller Club of California.

Secretary-treasurer Stanley Allen announces three new members and these gentlemen are—Warren D. Taylor, Harry Long, and C. H. Sprogins.

— PC —

On January 26, on resumption of the Tuesday luncheon gatherings, we were entertained by Dick Glissman, master mariner extraordinary and deep sea navigator for the Carlisle fleet, home port San Francisco.

— PC —

On February 2 Edward Williams, former marine engineer and now of the marketing department of Standard Oil Company of New York in North China, related engrossing observations of his work in that interesting part of the globe.

— PC —

For February 9, Dr. J. C. Perry, chief medical director of the United States Public Health Service, will address us on the functioning of this department.

— PC —

Spring golf tournament in-and-out-door training already is under way. F. P. Ritchie at the moment is a first honor favorite. He has a long way to go, however, before he can get past all the salt-water pellet propellers. Russ Pratt and W. Eddie Martin didn't even let cloudburst and frost stop their week-end rounds!



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(See Insurance.)

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(See Packing.)

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Western Engineering Company.

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Standard Oil Co.

Oil, Turbine.

Standard Oil Co.
Union Oil Co.

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Crane Packing Company.

Packing, Metallic.

Crane Packing Company
France Packing Co.
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Paint, Stack.

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Quips That Pass in the Night

Then He Traveled

They tell this one on Sammy Jones. It seems that for hours he had been sitting on the front porch talking . . . he and his girl. Only talking. The moon cast its tender gleam down on the young and handsome couple, who sat strangely apart. She sighed. Finally he said: "I wish I had money, dear. I'd travel."

Impulsively, she slipped her hand into his. Then rising, swiftly sped into the house.

Aghast, he looked at his hand. In his palm lay a nickel.

Too Obvious

A boy, going through a cemetery, read this inscription on a tombstone: "Not Dead but Sleeping."

Scratching his head awhile the boy remarked: "He sure ain't fooling nobody but hisself."

Visitor (looking over fraternity house): Don't you know roller towels are against the law?

Brother: Yes, but that one was put up before the law was passed.

A Mercenary Miss

Little Betty was going to have her first party. The occasion was her sixth birthday.

"Now, Betty, dear," said her mother, "I want you to ask anyone you like."

Betty looked thoughtful. "Then I'll ask Uncle Dick, Uncle Fred, grandpa, Auntie Freda, and—"

Her mother smiled.

"Wait a minute, Betty," she said; "they are all elderly people."

"I know," said the child, "but they have the most money."

Dame: Gee, John, that candy in that window makes my mouth water.

The John: Well, here is a blotter.

"I saw the doctor you told me to see."

"Did you tell him I sent you?"

"Yes, I did."

"What did he say?"

"He asked me to pay in advance."

Abe: "Do you play golf vit knick-crs?"

Levi: "No, vit white people."

"Her father kept a saloon."

"Is her family as old as that?"

The Preacher: "God helps those who help themselves."

Johnny: "Yes, and God help the guy who is caught helping himself."

Just Checking Up

Sambo was hired out on a railroad gang. At the close of the first shift he was all tired out and sought the boss.

"Mister, yo' sho' you all got me down on that payroll?"

"Sure," said the boss. "Here's your name—Sambo Simpson. That right?"

"Yes, suh," replied Sambo. "Ah jus' thought you might have me down as Samson."

Irish Cab-driver: G'wan, shake yerself, ye moth eaten old corpse! (Confidentially to his passenger.) It was the 'orse I was spakin' to, ma'am.

A painfully proper young man advanced this information to a flip flapper: "I've never kissed a girl in all my life."

"Well, don't come buzzing around me," announced the little flapper. "I'm not running a prep school."

We have just been informed that the British people spent a billion and a half for liquor last year. At least, they got liquor.

Turn About

The Smiths were on the balcony, and could hear what a young couple were saying in the garden below.

Mrs. Smith: "I think he wants to propose. We ought not to listen. Whistle to him."

Mr. Smith: "Why should I? Nobody whistled to warn me."

A Frenchman and an Englishman were having quite an argument at the trading post in Canada.

"Well," said the Englishman, "you don't ever see any half-breed English."

"The squaws had to draw the line somewhere," replied the Frenchman.

Meekness

The scarcity of genuinely meek people has often been remarked.

"Who was the first man?" asked the visiting minister.

"Adam," the children answered in chorus.

"Who was the first woman?"

"Eve," they all shouted.

"Who was the meekest man?"

"Moses."

"Who was the meekest woman?"

Everyone was silent. The children looked blankly at one another, but none could answer. Finally a little hand went up, and the preacher said: "Well, my boy, who was she?"

"There wasn't any."

Mate: I thought you said your room was spotless!

Fourth: Yes, sir. Not a clean spot in it.

"And this is your bump of curiosity?"

"Right, Professor. I got that by sticking my head in the elevator shaft to see if the elevator was going up. It was coming down."

Motorist (after knocking over a butcher's boy): "I'm sorry, my lad; are you all right?"

Boy (picking up contents of his basket): "Dunno. Here's me liver and ribs, but where's me kidney?"

Cuba Is a Nice Country

Globe: So you don't like Cuba.

Trotter: Naw, I went into a restaurant there to get a glass of milk. The waiter didn't speak English, so I drew a picture of a cow, and the son-of-a-gun went out and bought me a ticket to a bull fight.

Globe: Serves you right for ordering milk in Cuba.

Why She Claimed

The widow called at the insurance office and stated her case.

"But, madam," said the clerk, "you have no claim; your husband did not insure his life; he took out a policy against fire."

"Yes, I know," said the woman, "that is why I claim. He's been cremated."

"Isn't it funny that a mailman goes hiking on his day off?"

"Yes, Mary. Just like a sailor. What does he always do when he's on leave of absence?"

"Now, John, don't get vulgar."

A note to Johnny's teacher read: "Please excuse Johnny's absence yesterday. He fell in the ditch and got his pants muddy. By doing the same you will greatly oblige his mother."

Boss: So you want off this afternoon, eh? Grandmother dead, I suppose?

Office Boy: No, indeed, she has two tickets to the game.

Lawyer (reading Scottish uncle's will): "And to Horace, my nephew, who so much admired the view of distant mountains from my front window, I leave the view from aforesaid window."

Pacific Marine Review

MARCH, 1932

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REVILLAGIGEDO ARCHIPELAGO



Off for **REVILLAGIGEDO**

A party from the California Academy of Sciences is now aboard Templeton Crocker's yacht Zaca, bound for this remote Pacific archipelago to study bird, fish and mammal life.

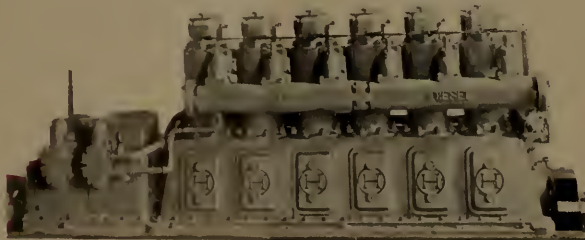
Twin-screw 120 H.P. Hill diesels power the Zaca and two Hill generating sets furnish all electric current for lighting, general power service, and the specially designed deep sea research apparatus.

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Pacific Marine Review

The National Magazine of Shipping

VOLUME XXIX

MARCH, 1932

NUMBER 3

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Member of Pacific Traffic Association

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Looking Over a Part of San Francisco and Her Port to the Golden Gate

Diesel Ships Gain

The tonnage of vessels launched during 1931, fitted with Diesel Engines exceeds by 237,000 tons the world's output of steam tonnage

Europe is building 10,000 to 20,000 ton ships exclusively Diesel,— while the rest of the world is fitting Diesels in 90% of ships now building of from 6,000 to 20,000 tons,— the United States continues exclusively with steam in these sizes:

Steamships and Diesel Ships under Construction in the World—January 1, 1932, (Lloyds)

COUNTRY	Tonnage 10,000 to 20,000		Tonnage 6,000 to 20,000	
	Steamships	Diesel Ships	Steamships	Diesel Ships
Great Britain	0	1	3	7
Germany	0	8	0	8
Denmark	0	0	0	4
Holland	0	0	0	7
Norway	0	0	0	1
Sweden	0	0	0	11
France	0	4	0	4
Italy	0	2	0	3
Spain	0	1	0	7
Japan	0	0	3	2
	0	16	6	54
Percent Diesel Ships		100%		90%
United States	6	0	12	0

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Pacific Marine Review

VOLUME XXIX

MARCH, 1932

NUMBER 3

Editorial Comment » » »



Shipping Legislation

MUCH shipping legislation was carried over from the Seventy-First Congress and is now pending before the Seventy-Second Congress. Much additional new legislation has been proposed and is now being considered by the Committees of the Seventy-Second Congress. We have before us a partial list covering fifty of these bills. Of these fifty bills, only 11 have the unqualified opposition of the owners and operators of ships, while 18 have the unqualified approval of these groups. On the remaining 21 bills in this list, 6 have qualified approval, 12 have qualified opposition, and on 3 the shipowners are neutral.

On the bulk of the present pending legislation, therefore, out of 47 pending bills sufficiently affecting shipping to arouse question in the minds of shipowners, there are 24 thought to be beneficial and 23 thought to be injurious. In other words, the present trend in Congress is to give the American shipping industry a little better than a 50 per cent. chance; and that trend is something for which the shipowners are very grateful.

One of these bills that has the approval of shipowners is the Carter Bill H.R. 4532. This measure is intended to aid the shipbuilders of the Pacific Coast by giving them a little better chance to get contracts for new ships built under the loan provisions of the Merchant Marine Act of 1928. The Carter Bill, if passed, would reduce by one half of one per cent. the annual interest rate to be charged by the Shipping Board on a construction loan on a new ship if the ship is built in a Pacific Coast shipyard. Every Chamber of

Commerce and every business and public service organization on the Pacific Coast ought to get behind this measure and push it through Congress with enthusiasm. There is no industry that employs more labor per gross value of output than does shipbuilding and every ship built on this coast means a proportionately large payroll for immediate distribution in all legitimate lines of trade.

One of the important measures now before the Seventy-Second Congress is Senate Bill 1963, known as the Shipping Act of 1932 or the Johnson Bill, which was introduced by Senator Johnson of California at the request of the United States Shipping Board. This bill would clothe the Shipping Board with virtually the same rate-regulatory and other powers over ocean cargo transportation that the Interstate Commerce Commission now holds over freight transportation on the railroads of the United States.

There is considerable difference of opinion among shipowners as to the desirability of federal control over the rates charged by ocean carriers. There is also a great deal of argument over the advisability of giving such control (if established) to such a body as the Shipping Board. The following represents our own reaction to the proposed legislation and is not to be taken as in any way reflecting the ideas of the shipowners' associations.

The United States Shipping Board is still (directly and indirectly) one of the largest shipowning and ship operating corporations in the world. As such, its present regulatory and fiscal powers affecting privately owned lines are far too large. It is a purely political body and may at any election be so changed as to entirely offset its present and recent favorable attitude toward privately owned American shipping. Why give it additional power?

If rate regulation is desirable, let us have an independent body that will regulate the acts—not only of privately owned and operated lines—but of the Shipping Board owned and controlled lines, the Panama Railroad Lines, the United States Navy and United States Army transports, and all other American vessels engaged in the transport of cargo.

Given an entering wedge, regulation will not stop at rates. Schedules also will be regulated. Bookkeeping will be regulated. Practically all of the business of the ocean carriers will be made public business.

Such regulation is sure to stifle that freedom to seek profitable routes which has always been the great source of profit in ship operation.

Unrestricted competition in times of depression is bad enough. Federal regulation, which puts every independent American line under the control of the most

powerful American shipowner, might be far worse.

In our opinion, giving these regulatory powers to the United States Shipping Board would be not only poor business but basically unconstitutional and unAmerican.



The Log—Who Owns It? What is its Purpose?

IN ancient accounts of voyages, in fact well down into the Seventeenth Century, ships at sea guessed how far they had run on a course and set down on the chart a "point of Imagination" from which to start on the next leg. Columbus' journal shows this and tells how he purposely underestimated the speed of his ships to avoid panic among the crew.

About 1620 some genius invented the "ship" or "chip" log. A little over 200 years later came the patent logs of Massey and Walker, and more recently the pressure tube logs. Just why these instruments should be called logs seems somewhat of a mystery. They are really speedometers.

Origin of the word "log" is lost in antiquity. According to Oxford Encyclopedic Dictionary, some of our primitive ancestors, noting for the first time the inert heavy lifeless appearance of a fallen tree, made a sound indicating these qualities and so brought into use the word log. Hence something inert thrown over the stern of a vessel to remain stationary while she runs away from it for a certain time period became in sea parlance a log.

Long before the advent of this log (speedometer) it had been required of shipmasters that they keep a daily journal wherein were to be set down the progress of the vessel and all happenings of importance, particularly the vital statistics of crew and passengers and all exercise of authority by the officers.

On the advent of the log, a log board was added to the bookkeeping equipment of all seagoing vessels. On this board records of all readings of log and courses were kept and these were transferred to the journal at stated intervals, usually at noon of each day. Since these entries on most ships constituted the bulk of the journal, that book came to be known as the Log Book or now, officially, The Log.

United States Navigation Laws require all masters of vessels to enter in this Log detailed information as to 12 specific matters, as follows:

First. Every legal conviction of member of crew and punishment inflicted.

Second. Every offense committed by member of crew for which it is intended to prosecute or enforce forfeiture of wages.

Third. Every offense punished and nature of punishment.

Fourth. Statement on conduct, character, qualifications of each member of crew.

Fifth. Every case of illness or injury.

Sixth. Every case of death and cause thereof.

Seventh. Every birth, sex of infant, names of parents.

Eighth. Every marriage, name and age of parties.

Ninth. Name of every seaman or apprentice who

ceases to be a member of crew otherwise than by death. The circumstances.

Tenth. Wages due any seaman or apprentice who dies, and gross deductions therefrom.

Eleventh. Detail account of sales of effects of seaman who died during voyage.

Twelfth. State of circumstances in all cases of collision.

Every entry of these official matters must be signed by the master and also by the mate or some other member of the crew and shall be entered as soon as possible after the event to which it relates. Failure to enter any of these events subjects the master to a fine of twenty five dollars for each offense. Any person who makes or has made an entry in any official log book more than 24 hours after the vessel arrives in port and describing an event occurring before her arrival in port is punishable by a fine of one hundred fifty dollars.

This short extract from the navigation law indicates quite emphatically that The Log of any ship is the property of, and under the sole jurisdiction of, the captain or master of that ship. The law quoted above was passed in the year 1900, so that this conception of the log cannot be attributed to old sailing ship days. It is a serious offense, practically perjury, to write false statements into the log. From the legal viewpoint, therefore, The Log of a ship is an official record of the doings of the master of that ship in his capacity of magistrate of a floating town.

Peculiar are the evolutionary progresses of language. Here we see that the most inert sound in the language becomes the name for a measurer of speed and for the official record of all vital statistics on a fast modern floating city.

In addition to The Log (official) on board ship, there are subsidiary records which have also adopted the name log. The Engineer's Log, the Steward's Log, Refrigeration Log, etc. The Engineer's Log keeps track of fuel used, horsepower generated, propeller revolutions, distance traveled by propeller revolutions, distance traveled by ship's log, apparent slip of propellers, and many other matters pertaining to the performance of the ship's machinery.

None of these subsidiary logs are official outside of the firm operating the vessel, and none of them is really authentic until signed by the master of the vessel. There has been much argument, humorous and serious, as to the relative importance of pilot house and engineer's desk, but to date the captain is still master of the ship and owner of The Log.



Errata

On page 11 of the January issue in the text of the article describing the turbo electric steamer Talamanca there appeared a statement "In the same room there is a 120 volt Gould Storage Battery." We are now informed by the Edison Storage Battery Co. that this was in error and that they supplied for this vessel an "Edison nickel-iron alkaline storage battery of 100 type A6H cells to serve as an emergency source of power for radio and lights." For this important duty aboard vessels of the United Fruit Company the Edison nickel-iron alkaline storage battery is practically standard equipment.

San Francisco Bay Preparing for New Ships

I. *The Port of San Francisco Spending Ten Millions in Extensions and Betterments*

OVER the length of San Francisco's bay waterfront from the Presidio to San Mateo's county line, there is a great stir of activity either in actual construction or contemplated improvements looking to development of better facilities to receive the larger vessels and greater commerce that are now evolving on Pacific Ocean trade routes. It was with this idea in mind that Governor James Rolph, Jr., of California, himself a shipping man of long experience, sought out a rather new type of personnel for the Board of State Harbor Commissioners who govern the policies of the Port of San Francisco and, in the name of the State of California, hold ownership of San Francisco's waterfront facing San Francisco Bay.

For this very responsible duty, Governor Rolph chose Patrick W. Meherin, Joseph J. Tynan, and Joseph A. Moore. These men are all worthy public spirited citizens of San Francisco who have achieved success in their several businesses. Two, Meherin and Moore, are native sons, second generation San Franciscans. Tynan has a record of more than twenty years constructive work for San Francisco. Meherin is a successful contractor, Tynan and Moore are executives of the two largest shipbuilding and repair plants on San Francisco Bay.

Naturally men of this experience are keenly interested in new construction, and the present Board, after a survey of the needs of the port, and in consultation with a committee representing the shipowners, the shippers, and the business men of San Francisco, immediately began to energetically push the work of new construction and of reconstruction.

This committee is composed of citizens nominated by the San Francisco Chamber of Commerce and by the State Board of Harbor Commissioners. Nominated by the Chamber are:

Louis C. Stewart, vice-president of Sudden & Christensen; Henry F. Grady, trade advisor to the chamber, and Hal M. Remington, manager of the transportation department, together with two representatives of the Junior Chamber of Commerce, E. P. Crossan, chairman of the marine committee, and Chalmers Graham of the Junior Chamber board of directors.

Board appointed members are:

Thomas G. Plant, operating manager of the American Hawaiian Steamship Company; George E. Hart, vice-president and manager of Farnsworth & Ruggles, drayage & warehousing; Percy C. Denroche, president of S. L. Jones & Co., importers and exporters; H. R. Gaither, president of the Pacific National Bank, and August F. Bulotti, secretary-treasurer of the Loop Lumber Company.

Known as the San Francisco Joint Committee on Port



San Francisco's illuminated ferry depot tower.

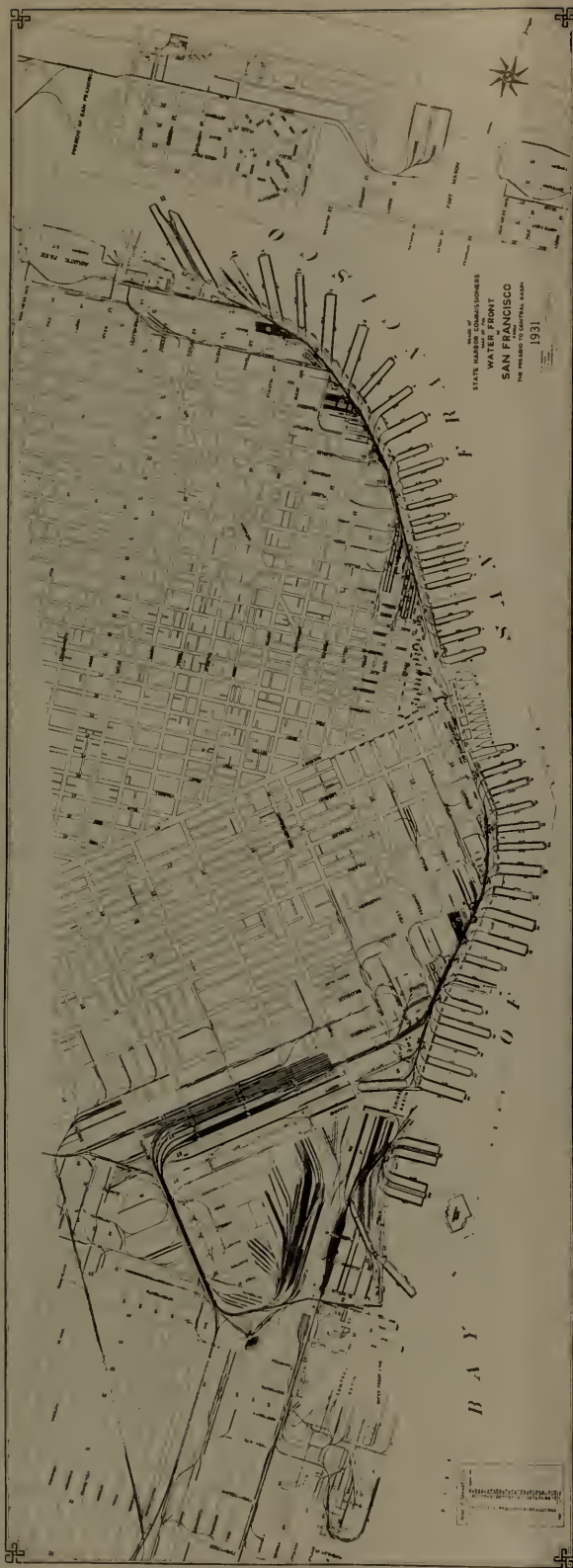
Development this group faces the responsible duty of "Conserving the present business of the Port of San Francisco and developing that business along acceptable lines." To do this it will be necessary for the committee and the Chamber of Commerce to line up the people of San Francisco in a strong sentiment for the Business of the Port of San Francisco as the chief commercial asset of the City of San Francisco.

In the matter of ship repair facilities the Bay of San Francisco is outstanding among the Harbors of America. Not only do we have a larger specific drydock capacity for the tonnage entering the port than any other American harbor, but we have the largest privately operated dry dock in America, a dock capable of taking the largest ship afloat today and considerably larger than any commercial dock on the Atlantic Coast south of Boston.

The oldest portion of San Francisco's present port is that part lying between the great Union Ferry Depot at the foot of Market Street and the westward bend at Telegraph Hill, or Piers 3 to 29. Piers and slips here are too narrow, too short, for modern conditions. Pier 17 is the best of these piers and is in the center of the group. The Board planned to gradually remove piers 7, 9, 11, 13, 15, and 19, 21, 23, 25, and 27*, replacing each of these groups of five old piers with four new piers wider and longer and with wider slips. Of this work, Pier 15 has been completed, the substructure of Pier 23 has been completed, and the contract has been let and work commenced on the pier shed for Pier 23.

The new piers will be 150 to 200 feet wide and around 800 feet long. They are carried on concrete-jacketed timber piles and have a reinforced concrete floor structure. The sheds are steel frame with concrete walls. Long experience with local conditions has led the engineering department of the Board of State Harbor

*Starting with the Ferry Building the piers on the north are numbered with odd numbers and south with even numbers.



THE PORT OF SAN FRANCISCO

The upper map shows the active portion of the waterfront at San Francisco, owned by the State of California and operated under the Board of State Harbor Commissioners.

The map at the right shows the waterfront of San Francisco extending south from that shown on the upper map to the county line. All of this waterfront is likewise controlled by the Board of State Harbor Commissioners, although a considerable portion of it is privately owned. It will be noted that there is large opportunity here for future development.

Pier 48 near the south end of the active waterfront of San Francisco is equipped with a double pier shed. This pier is occupied by the Dollar round-the-world steamship service and is one of the busiest of San Francisco's piers.



Commissioners to adopt either timber piles, concrete-jacketed, or reinforced concrete, according to the conditions on the bottom. Where the layer of mud is deep, the most economical method is timber piling, concrete-jacketed to a point a few feet below the upper surface of mud. Where hard bottom is close and mud quite shallow, a reinforced concrete pile is most economical. Completion of this replacement program from Pier 5 to Pier 29 will cost approximately \$5,000,000.

South of the Ferry Building there are several extensions and improvements under way, and a large amount of work is planned for the near future.

The outshore end of Pier 38 is being extended to the same line as Pier 40, involving the construction of approximately 240 feet of pier and shed. It is intended that the McCormick Steamship Company, now operating at Piers 37 and 40 shall move their Pier 37 activities to Pier 38. A new bulkhead building is planned across the shore end of the slip between Piers 38 and 40. This building will be of two stories with offices above and with transfer connection between the piers and street loading facilities on the ground floor. This work is now under way.

Plans are complete for the extension of Pier 42 by 135 feet and the construction of a building and wharf at the inshore end of the slip between Piers 42 and 44. This structure will be two stories on the Embarcadero

front with 40-foot depth, giving ample room on the second floor for baggage rooms, waiting rooms, and other passenger conveniences. The wharf will have a total depth of 150 feet from the Embarcadero front, and outside the two-story structure will be covered by a one-story cargo shed. These plans call for a two-story shed on Pier 42, the second floor being devoted to passengers, passengers' baggage, express, and certain classes of cargo.

Work is now under way extending Pier 44 by about 165 feet and adding a new railroad track along the north side.

Plans are being prepared for the extension of Pier 46 by 200 feet in length and the improvement of the shed on that pier to better care for passengers and passengers' baggage.

Lying between the north side of the State Food Products Terminal and Berry Street is a large irregularly shaped lot belonging to the Harbor Board. Plans are now being prepared for the improvement of this lot with a two-story, reinforced concrete building to be known as the Cotton Terminal and to serve as a transit storage terminal for cotton and other commodities. This building will have 100,000 square feet of storage space on each floor. The ground floor will be served by the same tracks that now serve the State Food Products Terminal, and the upper floor by the elevated



Pier 45 at the north end of the central area of San Francisco's port is equipped with double pier sheds and at its outer end with a slip for freight car ferries and connecting by rail with the belt line railway. This is one of the newest and largest piers in the Port and is used by a number of steamship companies.

Some Interiors
of Busy Piers
on Waterfront
at San Francisco



Above and at the left are shown two pier sheds on San Francisco's waterfront with cargoes of California produce assembled for shipment.



Above and at the right: California horticultural products in the refrigerated rooms of the California State Produce Terminal on Channel Street, San Francisco.



ramp of that building. If business warrants, a cotton compress will be installed. Loading and unloading of vessels will be through the State Food Products Terminal to the deep water of Channel Street.

Plans for the extension of the piers immediately south of Channel are held in abeyance. When, or if, the Board of State Harbor Commissioners acquires Mission Rock, there will be large construction activity in that region. The Board is participating in the present construction of the new Third Street Bascule bridge across the Channel and has plans ready for the extension of the Belt Line Railroad to serve the port improvements south of that waterway.

Improvements at Islais Creek, under way or planned, include construction of considerable magnitude and variety. A sea wall has been built along the north side of this creek from Third Street westerly to the Southern Pacific right-of-way, and plans are ready for wharfage to serve the lumber interests or any other industry that may be located in the available area between the Creek and Army Street. This area has many advantages including good frontage on deep water, on two main paved thoroughfares, on main line railroad tracks, and streetcar tracks. On the south side of Islais Creek the Grain Terminal is to be enlarged by additional bin space for bulk grain and pits for car unloaders. Plans are finished for an open wharf extending easterly 900 feet from the present Grain Terminal. This is for lumber primarily and will be served by two ship-side tracks.

At the extreme north end of the active waterfront is Fisherman's Lagoon built to take care of San Francisco's large fleet of fishing craft. It is one of the most popular places in the harbor. Notwithstanding the substitution of gasoline and diesel engines for the picturesque lateen sails of an earlier day, the fishermen themselves and their women folk are a very interesting group. Fisherman's Lagoon in many of its aspects reminds one of old Mediterranean ports. So it has become famous among travelers and lures also many of the city folks from both sides of the bay. Until very recently the approach to this spot was very bad (almost dangerous) for motorists. To remedy this the Harbor Board has installed a concrete bulkhead wall, making possible the paving of Jefferson Street so that now motorists may drive on continuous pavement from the Ferry Building at the foot of Market Street along the Embarcadero to Jefferson Street, and out Jefferson to Fisherman's Lagoon, the Hyde Street ferries, and the San Francisco Aquatic Park.

The total expenditures for work under construction or about to be contracted for will run well over ten million dollars. Thus is the Board of State Harbor Commissioners for the Port of San Francisco meeting the challenge presented by the increase in size and speed of carriers and the development of cargo tonnage on Pacific trade routes.

The city of San Francisco also is being challenged. The State of California has provided the City of San Francisco with a fine modern port, the physical value of which, at the present time, is upwards of seventy million dollars. San Francisco, thus freed of the financial burden of building port facilities, ought to be all the more able to advertise and boost its port and attract business to itself. Other things being equal, the ship goes to that port which is the least expensive to the ship. There are many ways in which San Francisco as a city could make her State-financed port attractive to ships. One of these would be to reduce to a minimum

or eliminate altogether, the rate charged ships for fresh water. Every ship attracted to this port means business for the merchants of this city. San Francisco is peculiarly favored in this regard because the waterfront is so close to the down-town business section. Cheap or free water for ships would be a good business for a city owning its water supply system.

Isherwood Construction

DURING the calendar year 1931, there were delivered or under construction to the Isherwood System of Ship Construction 31 vessels with an aggregate deadweight tonnage of 84,140. This brings the total of vessels built to this system, from its inception in 1906, to 1858 ships with an aggregate deadweight of 15,441,600 tons.

Of this total, 9,244,000 deadweight tons, including 994 vessels, were tankers; and 6,187,000 deadweight tons, representing 864 vessels, were miscellaneous types including passenger liners, general cargo vessels, colliers, ore steamers, Great Lakes bulk freight carriers, passenger ferries, freight ferries, barges, and dredges.

Of particular interest to Americans, and different from the ordinary run of hull, are, first, the diesel-electric driven oil barge with completely welded hull built by the Sun Shipbuilding & Drydock Company for the Atlantic Refining Company and, second, the two car ferries for the Seatrain Lines, Inc., also building at the same yard. These latter vessels each will have capacity for 100 loaded cars and will be capable of 15½ knots sea speed on the run from New Orleans to Havana. They are to be built with double skin and so subdivided as to be practically unsinkable.

The Isherwood Bracketless System continues to make good progress. During the five years of its public life it has been adopted on 128 vessels, aggregating 1,147,000 deadweight tons.

A more recent introduction by Sir Joseph W. Isherwood, Ltd., is "Isherwood Steel Hatch Covers," which is a very practical device for overcoming the inherent vice of the ordinary wooden hatch board.

Names Grace Liners

THE decision of the Grace Steamship Company to christen the four liners now a-building for its Panama Mail Service between New York, Central America, and California by the names of Saints recalls a sea-superstition as old as Christianity.

It has always been the custom of the Grace Steamship Company in christening the ships for its west coast of South America service to follow in this venerable tradition of the great Hispanic seamen. The Santa boats, so-called from the Canal to the south tip of Chile, are as familiar quantities in that quarter of the Pacific as the ubiquitous seabirds. Now that the new vessels will be called the Santa Rosa, Santa Paula, Santa Lucia, and Santa Elena, the same waters which almost four centuries ago were scored by the keels of the Nuestra Señora de la Concepcion and those other great units of the treasure fleets, will know another, sailing also under the aegis of musical and saintly names.

[Grace Log]

The Fibreboard Case Afloat

Part III—An Appreciation of a World Wide Service to Ship Operators and Shippers

WE have recited in two previous articles the advantages to ship owners and shippers of using fibreboard cases wherever possible rather than wooden crates, in packing for export such merchandise as canned goods, bottled goods, goods in cartons, and miscellaneous items not too heavy or too bulky for these cases. Not all fibreboard, however, is of the quality required for rendering good service under the strenuous conditions met in export shipping.

Bronson L. Heustis, in his excellent handbook "Shipping Containers," warns shippers against the acceptance of fibreboard cases without physical test of the fibreboard. Says he, "Most fibreboards look very much alike—but there can be a world of difference in them. —This material is usually tested by the Mullen tester. In these machines a piece of the material is placed on a small platform on the machine and securely clamped in place. Through a hole in the platform a rubber diaphragm, operated by a fluid under pressure, acts against the specimen of fibreboard until the diaphragm bursts a hole in the specimen. The bursting pressure is measured on an ordinary pressure gauge. A fibreboard showing a 50 pound test by this method would be considered a strong board, whereas a test of 350 pounds would represent a very high grade of board. It is quite reasonable to assume that a reliable maker will not permit his product to deviate far from the given standard, but the customer must indicate the strength desired and must have a check on actual performance which is readily obtained by applying the test."



Another view of loading fibreboard case shipments on the Steamship Willpolo. Note the clear space over cargo hatches left by the arrangement of the deck load of lumber.



An unusual loading condition at the Port of Oakland. This view shows California produce in export fibreboard cases being lifted over a 19-foot lumber deck load to be stowed in the hold of the Steamship Willpolo.

This book was published in 1925 and describes in these words the lack of standardization in fibreboard quality that existed at that time. In fact, much of the fibreboard case business in those days seemed to the user to be on the old "Caveat Emptor" basis and many shippers found that fibreboard would not stand up under their special requirements.

To correct this situation the Export Fibreboard Case Association was formed with the purpose, as stated in Part I of this series, of servicing "fibreboard shipments and carrying on research work and practical experiment to produce the best fibreboard case for any given purpose."

The Export Fibreboard Case Association is not in the commercial business of selling fibreboard cases. It is rather in the business of creating new outlets for the fibreboard case by an intelligently directed service to the users of this shipping container, and an intense study of the special container problems of shippers to discover the applicability of fibreboard to the solution of those problems.

The E. F. C. A. stamp on a fibreboard case means that the fibreboard in that case has been manufactured to the standards set up by the association. That insures a uniform board of great strength, weather-proof and practically rat-proof. The stamp also carries with it the practical assurance, through the service work of the association, that the knock down fibreboard case has been adequately assembled, bound, and marked by the shipper according to standard practice set up by the association.

Supported by its world-wide membership of firms manufacturing fibreboard, the association has established service centers in the important ports of the world and offers this advisory and adjustment service free to shippers and ship operators.

With the Shipowners and Shipbuilders of America

Reports of Committees to the Fifth National Conference on the Merchant Marine

A RESOLUTION adopted by the Fourth National Conference on the Merchant Marine authorized the Chairman of the Shipping Board to appoint a standing committee, not less than five in number, to review the papers read at the conference, to take such initial steps as might be necessary to carry into effect the various resolutions adopted, to decide upon the merit of the recommendations contained in the various addresses delivered to the conference, to follow up those that are deemed meritorious, and to report results to the next annual conference.

The following named persons were appointed members of the standing committee:

T. V. O'Connor, Chairman, United States Shipping Board; Ernest Lee Jahneke, Assistant Secretary of the Navy;

H. B. Walker, president, American Steamship Owners' Association;

H. Gerrish Smith, president, National Council of American Shipbuilders;

Joseph T. Lykes, president, Lykes Brothers Company, Inc.;

George A. Marr, vice-president, Lake Carriers' Association;

J. C. Rohlfs, president, Pacific American Steamship Association;

Robert C. Tuttle, manager, Marine Department, The Atlantic Refining Company;

Malcolm M. Stewart, chairman, Middle West Foreign Trade Committee.

The first meeting of this committee was held April 24, 1931, at Washington, D.C. It was chiefly concerned with organization and a discussion of the best manner in which to carry on its work. T. V. O'Connor was elected chairman. It was agreed that the committee's work would be best handled if assigned to sub-committees to study and report upon each of the following subjects:

1. Methods of Increasing Patronage for American Ships.
2. Adequate Mail Pay for High Speed Ships.
3. Government Aid to Ships not Benefited by Mail Contracts.
4. Foreign Competition in Indirect Trade.
5. Safety of Marine Workers.
6. Panama Canal Tolls and Measurement.
7. Safety of Life at Sea.
8. Proposals of Railroads for Ownership of Water Carriers and Regulation by the Interstate Commerce Commission.
9. Construction of Naval Vessels in Private American Yards.

10. Cost Differential in the Operation of United States vs. Foreign Ships.

Second meeting of Standing Committee was held October 6, 1931, at which time eight of the sub-committees had completed reports. Subcommittees on "Government Aid to Ships not Benefited by Mail Contracts" and "Foreign Competition in Indirect Trade" reported progress, but had not yet finished their work. The eight completed reports were discussed in detail and, with certain changes, were adopted by the Standing Committee. Resolutions were also adopted urging enactment of legislation providing for tax exemptions on American vessels operating in foreign trade, to the extent that deductions from taxable incomes are devoted to new ship construction in American yards; the amendment of the coastwise laws so as to prohibit the so-called "voyages to nowhere;" and discontinuance of the practice of displaying, in government offices, pictures of foreign-flag ships.

Third meeting of Standing Committee was held December 7, 1931. Work of sub-committees "Foreign Competition in Indirect Trade" and "Government Aid to Ships Not Benefited by Mail Contracts" was still incomplete. Resolutions were adopted favoring codification of the navigation laws; appropriation of \$75,000 by Congress in order to carry out certain provisions of the Naval Reserve Act; continuance of the Merchant Marine Bulletin, the Shipping Board's official publication; and retention of marine hospitals under the control of Public Health Service.

Standing Committee set January 27 and 28 as the tentative dates, subject to the approval of the Shipping Board, for the Fifth National Conference on the Merchant Marine.

The committee has taken steps to accomplish some of the beneficial results contemplated in the resolutions adopted. Copies thereof were distributed to representative steamship owning and operating associations, public officials, and members of Congress whose committees are concerned with legislation affecting the various subjects. The committee is pleased to report that it has received many communications in which hearty cooperation has been pledged by both public officials and private interests, to accomplish the committee's recommendations in the interest of the merchant marine. With respect to the codification of the navigation laws, the Shipping Board has directed its Bureau of Law to make this subject one of primary concern, to the end that the proposed codification may be enacted by Congress. Other recommendations of the committee are now being actively considered by public officials and steamship owning and operating associations, and several bills have been introduced in Congress which, if enacted into law, will also tend to put the recommendations into effect.

REPORTS OF SUB-COMMITTEES TO THE STANDING COMMITTEE

Methods of Increasing Patronage in American Ships. Messrs. H. B. Walker, Malcolm M. Stewart, J. C. Rohlf.

In 1910 American ships carried 10 per cent. of exports and imports; in 1931, 34 per cent. Increase due to pioneering work of Shipping Board in services afterwards sold to private operators. Maintenance and improvement of these services now made possible by aids granted under provisions of Merchant Marine Act, 1928, provided there is increased use of the ships by American exporters and importers.

Shipping is a public utility that must be maintained under the American flag and must be patronized by American foreign traders and American travelers.

Committee recommends to this end: Increased co-operation of representatives of U.S. Department of Commerce in securing information as to the needs of foreign markets, greater promptness in distributing this information to American manufacturers and producers; the use of a slogan on cancellation stamps of Postoffice Department, such as "Use American Ships" or "Ship and Travel by American Ships;" that a fund of \$50,000 be made available by the U.S. Shipping Board for publicity purposes to be used for articles, editorials, and pamphlets to stimulate interest in American shipping; that \$15,000 of this fund be used to supply ammunition for a publicity campaign through free services offered by the American Farm Bureau Federation to reach their membership of 1,500,000; and also that part of the appropriation be used through the Middle West Foreign Trade Committee.

Adequate Mail Pay for High Speed Ships. Messrs. Ernest Lee Jahncke, H. G. Smith, H. B. Walker.

Committee believes rates of mail pay provided by Merchant Marine Act, 1928, will closely compensate for cost differential between American- and British-built vessels up to 20 knots. For greater speeds, committee thinks mail pay too low. Committee recommends appointment of a technical committee consisting of a representative each from the Shipping Board, Department of Commerce, Postoffice Department, Navy Department, the ship owners, and the shipbuilders to study this matter very carefully. This committee should take into account very thoroughly the aids now being granted to fast ships by other governments on various routes and should make its studies as promptly as possible so that the results may be available for Congress at its next session.

Safety of Marine Workers. Messrs. Robert C. Tuttle, George A. Marr, J. T. Lykes.

Basic requisites are: First, physical examination to determine physical fitness for job; second, greater use by member companies of excellent safety rules and operating condition codes set up by various associations; third, more and better organization of marine accident prevention work; fourth, more cooperation in reporting statistics covering the frequency, severity, cause, and cost of marine accidents. Some recent figures indicate that frequency rate in marine industry is almost twice that in land industry, a "sufficient proof to the marine industry of the necessity of concerted and aggressive action in the work for the safety of the marine worker."

Panama Canal Tolls and Measurement. Messrs. J. T. Lykes, J. C. Rohlf, H. B. Walker.

Committee recommends that the Standing Committee go on record as being opposed to any plan doing away with the dual system of admeasurement at the Panama Canal unless that proposed as a substitute provides such rates per ton for vessels transiting the Canal that the tolls now paid by any one company will not be increased; in fact, the tolls paid at present by commercial vessels, if based upon that part of the cost of the Canal which can properly be assessed to commercial interests, furnish a handsome return to the Government.

Safety of Life at Sea. Messrs. T. V. O'Connor, H. B. Walker, H. G. Smith.

The Safety Convention of 1929 and the Load Line Convention of 1930 pledge the maritime countries of the world to uniform, reasonable standards of safety at sea, first for human life and next for ships and cargo. The Load Line Convention has already been ratified by this government. It is most important that the United States also ratify, at the earliest practicable date, the Safety Convention. Such action will, no doubt, insure the convention coming into effect without much further delay. Subcommittee recommends to the National Standing Committee that the Fifth National Conference on the Merchant Marine go on record as urging ratification of the Safety Convention; also that other bodies interested in the merchant marine and in commerce by sea be invited to join in urging ratification, in order to secure the manifest benefits now obtainable without compromising and with ample protection for the interests of passengers, crews, ship-owners, and shippers.

Proposals of Railroads for Ownership of Water Carriers and Regulation by the Interstate Commerce Commission. Messrs. H. B. Walker, J. C. Rohlf, Malcolm Stewart, George A. Marr.

Water transportation, except in the case of through rail and water transportation, has always been a business of open competition, with the result that the greatest coastal water transportation facilities in the world have been developed in the United States. Modern ships give frequent and regular service at low rates to all shippers. It is now proposed by the railroads that this be changed by vesting the control of the rates in the Interstate Commerce Commission whose particular interest has been the railroads. The railroads alone could benefit from the proposed change. The shipping public will be denied the low rates by water which exist today as the result of very keen competition. The shipping public at present is guarded against discriminatory and unreasonable rates by vesting regulatory authority in the United States Shipping Board.

Committee is of the opinion that this is sufficient, and further that if the recommendations of the railway executives are to be put into effect by giving the Interstate Commerce Commission jurisdiction over the port-to-port business of the steamship lines, the result would be most disastrous to our merchant marine. Committee, therefore, strongly recommends that the Standing Committee on Merchant Marine go on record as being opposed to the recommendations of the railway executives in so far as they affect water transportation.

Construction of Naval Vessels in Private American Yards. Messrs. H. G. Smith, T. V. O'Connor, J. C. Rohlf's.

Analyses of the cost of operating private yards show how contracts for naval vessels enable yards to build both merchant and naval tonnage more economically than either class by itself. Naval construction in private yards is, therefore, of great importance to the merchant marine. Committee therefore asks that the conference go on record as requesting Secretary of the Navy to give this matter serious consideration in awarding contracts.

Cost Differential in the Operation of United States vs. Foreign Ships. Messrs. H. G. Smith, T. V. O'Connor, H. B. Walker, Robert C. Tuttle, J. C. Rohlf's.

The operator of an American-owned and American-built vessel is at a disadvantage in competition with the operator of a foreign-owned and foreign-built vessel in the same trade because of the greater cost of operation of an American vessel, due primarily to the higher wage rates than exist in any other country of the world. Some of the important handicaps are:

- (a) Higher pay of officers and crew on United States vessels.
- (b) Higher cost of the subsistence of officers and crew on United States vessels.
- (c) Higher cost of the repair of ships in the United States.
- (d) Higher cost of shore staffs of employees involved in the operation of American ships due to general offices being located in the United States.
- (e) Higher cost of ships constructed in the United States.

Of these various items analyses have been made from time to time of the pay of officers and crew with the cost of their subsistence on American vessels as compared with similar costs on foreign vessels. So far as known, however, no recent analysis of this character has been made covering vessels of all seagoing types.

So far as the cost of repairs is concerned they are much higher in the United States than abroad, although so far as known no detailed analysis of the differential in cost has been made.

As to the cost of shore staffs the committee understands that the committee on mail contracts takes into account the higher cost of such staffs in the United States than abroad. It is not aware, however, that any detailed analysis has ever been made on this item.

It is understood that the Shipping Board has recently undertaken a careful analysis of the cost differential on items (a) to (d) inclusive, and that the results of this analysis will ultimately be available to the Standing Committee on the Merchant Marine. Committee recommends that this analysis be continued.

The last of these handicaps—that due to the higher cost of building vessels in the United States—is probably greater than the handicaps due to all of the other items together because it involves the operating charges for interest on investment, insurance, and depreciation which are based on first cost and necessarily continue throughout the life of the vessel. About four years ago, the National Council of American Shipbuilders made a careful analysis of the cost of building similar vessels in the United States and abroad. This analysis showed that the cost to the shipbuilder is about 54 per cent. greater in the United States than in Great Britain for a combination passenger and cargo vessel, 59 per

cent. greater for a cargo vessel, and 60 per cent. greater for an oil tanker when American and foreign shipyards are working under similar conditions as to capacity. It is understood that the Shipping Board made an investigation at about the same time which confirmed these figures. These percentages do not, however, necessarily represent the difference in cost to an owner of a vessel built in the United States as compared with one built abroad because under stress conditions of employment, foreign shipbuilding contracts have been taken at figures that are said to be below cost and, therefore, the difference in cost to the owner between a vessel built in the United States and abroad at this time is much greater than that shown above.

Committee is of the opinion that the Shipping Board should at this time, as required by Section 12 of the Shipping Act of 1916, make a check of its previous results on the differential in American and foreign shipbuilding costs, both to the shipbuilder and to the owner of a passenger vessel, combination vessel, cargo vessel, and an oil tanker.

Regardless of the results of such an analysis, however, it is recognized that the differential will be great and that it is a very important factor in the development of an American merchant marine in our foreign trade and that every means should be taken to reduce this differential to the lowest possible limits.

This subject of cost differential was dealt with at some length at the Second, Third, and Fourth meetings of the National Conference on the Merchant Marine, and at the Second Conference a Committee was appointed to consider the subject of "Reduction of Differential Between Shipbuilding Costs Here and Abroad," and a report thereon was submitted shortly before the meeting of the Third Conference.

The committee recognized that the reduction of cost differential was a problem in which not only the shipbuilder but the shipowner and the government were involved and that each can exercise an influence in reducing it. It is manifest that the requirements of American steamship owners cannot be in excess of those demanded for vessels built abroad without adding to the cost of American-built vessels. It is also manifest that the contractual requirements of the government as to military features, subdivision, and inspection cannot be in excess of those for a foreign-built vessel without adding to cost.

The first need, therefore, in reducing the cost differential is to see that **no unnecessary requirements are imposed in the American-designed vessel** or that, if additional demands are necessary, they are justified by the service in which the vessel is to be operated.

The committee report sets forth that the most important condition for the economical construction of ships, once the design is determined upon, is a reasonably normal volume of work in the shipyard that will permit the maintenance of an experienced staff of technical and mechanical employees. While this condition has obtained in several of our shipyards during the past two years there is a probability that the volume of work will diminish during the next year or two and it is in relation thereto that the best efforts of the standing committee can be put forth, first by urging such action by Congress to aid in the replacement of cargo vessels as will insure the beginning at an early date of the replacement of vessels of this type or of such vessels as may be substituted for them.

Committee is also of the opinion that the Shipping Board should undertake an analysis of each of its for-

eign trade services so as to determine as accurately as possible the anticipated future needs of these services as to numbers and types of vessels, and the extent to which aid should be granted.

If vessels of the same or similar type can be used in different services to round out our merchant fleet, some degree of standardization may be possible which will result in a lower cost of construction. An analysis of future requirements should, therefore, keep this matter in mind so as to obtain the advantage in cost which will result from the construction of a number of vessels from the same or similar plans.

A program that will provide for the replacement during the next twenty years of the number of vessels we now have upon the seas in our foreign and coastwise trades will keep our shipyards going at just about their present state of activity.

Another very definite aid to a reduction in cost of merchant vessels would result from the building of naval vessels in private shipyards.

Summarizing, therefore, our recommendations are:

1. Continue the analysis by the Shipping Board of handicaps (a) to (d) inclusive, which is now underway.
2. Determine at the earliest practicable date the present day cost differential between vessels built in the United States and those built abroad.
3. Analyze our foreign trade fleets so as to determine as accurately as possible the number and types of ships and when needed to replace those now in service.
4. Urge Congress to enact at an early date such legislation as necessary to encourage the building of cargo ships to replace old vessels now in service so that their construction may follow closely behind the building program now under way in our shipyards.
5. Urge the building of naval vessels in private shipyards.

New Liners Characteristic of Matson Progress

THE Matson Navigation Company was organized in 1901 to take over the business of Captain William Matson, who in 1882 founded the Matson Line with a small schooner, the Emma Claudina, a vessel of some 200 tons. Many ships have since been added to the fleet whose names are household words on the Pacific Coast

and in Hawaii. Of these names, particular sentiment is attached to the Lurline, the name to be given the third of the present group, since the first ship built to Captain Matson's order was the brigantine Lurline; this was also the name of the first steamship built to his order in 1908.

In 1926 the Matson Line purchased the Oceanic Line, whose three steamers, the Sierra, Sonoma, and Ventura are operated

in the Matson Line's South Seas and Australian service between San Francisco, Hawaii, Samoa, Fiji Islands, New Zealand, and Australia. Mariposa and her sister ships Monterey and Lurline will enter this service upon completion.

The present flagship of the Matson fleet, Malolo, built at the famous Cramp shipyard, was placed in service in 1927.

In conjunction with the American-Hawaiian Steamship Company, the Matson Line in 1928 formed the Oceanic and Occidental Navigation Company, operating some 20 freighters. One-half of these are operated by the Matson Line serving Australia and New Zealand; the American-Hawaiian Company operates the other ten in the Oriental and Philippines service.

November 1930 marked another step in the development of this great firm, for during that month a consolidation went into effect with the Los Angeles Steamship Company, thus including Los Angeles in the

schedule of the Matson Line Australian services as well as San Francisco.

Such is, then, the operating background behind the trio of new ships headed by Mariposa, new Queen of the Pacific. The company's traditions are ably carried on by W. P. Roth, president; by A. C. Dierickx, vice-president; and his assistant, G. K. Nichols, who are leading spirits in the development of these magnificent new vessels.

The Fore River plant of the Bethlehem Shipbuilding Corporation located at Quincy, Massachusetts, originated in 1883 with a small company known first as F. O. Wellington and Company, and later as the Fore River Ship and Engine Company. This company began by the manufacture of steam engines, their first being a 50-horsepower engine for a small passenger steamer, but in 1896 the first hull, that of the yacht Sally, was constructed.

In 1915 the yard was acquired by the Bethlehem Shipbuilding Corporation and has been largely rebuilt and expanded until it now comprises fourteen building slips and is capable of handling the largest vessels of any type.

Since its beginning this yard has produced almost every type of vessel from carfloats and barges to the largest vessel built in an American yard, namely, the airplane carrier Lexington, completed in 1928. These vessels include ferries, trawlers, freighters, bulk oil and coal carriers, yachts, sailing vessels, submarines, destroyers, battleships, and passenger steamers of all types.

The shops and equipment are of the most modern and up-to-date type. The organization, built up under the leadership of S. W. Wakeman, vice-president, and H. E. D. Gould, general manager, stands second to none in the shipbuilding industry of the United States today.



Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part XIV—Calculating the Problem

By L. L. Westling

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TO illustrate the calculations for a refrigeration plant, the following problem has been assumed. PROBLEM: A vessel has a 'tween deck compartment at its mid-length in which cold storage cargo rooms are to be built. The length of the space is 60 feet, the beam of the vessel in way of this space is 72 feet inside of the plating. The 'tween deck height is 9 feet. The frames are 10-inch channels and the beams are 7-inch channels. Mid-length of the space is a cargo hatch to the hold 18 feet by 24 feet.

Six compartments are wanted, four in the wings, all of equal size and one at each end of the hatch. A 3-foot passageway is to be left around the hatch. Two wing rooms and one of the center-line rooms are to be equipped with meat rails.

All rooms are to be convertible to freezers or coolers; and for maximum refrigeration load it is assumed that 50 per cent. of the space will be used for chilled meat cargo and 50 per cent. for vegetable coolers or chill rooms.

REQUIRED: The revenue space available and the refrigeration load. (Assuming that the cargo heat shall be removed in an arbitrary period of 24 hours.)

Rough Check of Revenue Space

Total 'tween deck area	72'x60'	4,320 sq. ft.
Less hatch & passage-way.....	24'x30'	720 sq. ft.

Gross area of available space.....	3600 sq. ft.
'Tween deck height	x 9 ft.

Gross volume of available space.....	32,400 cu. ft.
Less 25% for construction, insulation, etc..	8100 cu. ft.

Volume inside insulation	24,300 cu. ft.
Less 15% for coils, baffles, gratings, ventilation, etc.	3,645 cu. ft.

Net revenue space, approximately.....	20,655 cu. ft.
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Calculations

Outboard Rooms:	
Beam of ship	72'-0"
Width of hatch (18') and two passage-ways (6')	24'-0"
Thickness of shell insulation (2x13")	2'-2"
Thickness of two 8" partitions.....	1'-4" 27'-6"
Gross width of two rooms	44'-6"
Gross width each room	22'-3"

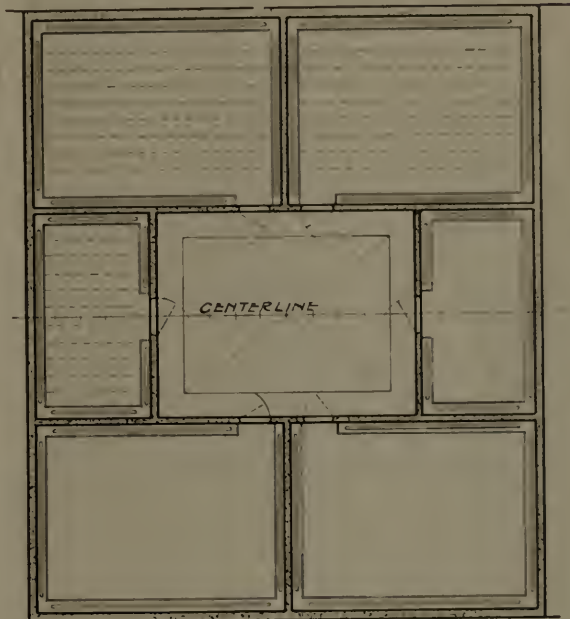


Diagram showing the arrangement of six refrigerator rooms around the hatchway in a 'tween deck compartment to illustrate the assumed problem for which calculations are given in this article.

Less depth 2 banks coils and baffles	1'-4"
Net width, each wing room	20'-11"
Gross length of 'tween deck space	60'-0"
Thickness of insulation, two bulkheads....	1'-8"
Thickness of one partition	-8" 2'-4"
Gross length of two rooms	57'- 8"
Gross length of each room	28'-10"
Less two banks of coils and baffles.....	1'- 4"
Net length of each room	27'- 6"
'Tween deck height in the steel	9'- 0"
Thickness of insulation of deck-head....	1'-0"
Thickness of insulation of deck	-8' 1'-8"

Gross height of rooms	7'- 4"
Thickness of gratings	- 3"
Net height of rooms without meat rails..	7'- 1"
Less depth of meat rails	- 7"
Net height of rooms with meat rails	6'- 6"
Gross volume of outboard rooms—22'3"x 28'10"x7'4"	= 4702 cu. ft.
Net volume of outboard rooms without meat rails—20'11"x27'6"x7'1"	= 4502 cu. ft.
Net volume of outboard rooms with meat rails—20'11"x27'6"x6'6"	= 3738 cu. ft.

Centerline Rooms:

Width between inboard faces of insula- tion of outboard rooms, or gross width of center-line rooms	24'- 0"
Less two banks of coils and baffles	1'- 4"
Net width of centerline rooms	22'- 8"
Length of 'tween deck space	60'- 0"
Length of hatch and width of two pas- sage-ways 24'-0" + 6'-0"	= 30'- 0"
Two thickness bulkhead insulation	1'- 8"
Two thickness partitions	1'- 4" 33'- 0"
Gross length of two rooms	27'- 0"
Gross length of each room	13'- 6"
Less two banks of coils and baffles.....	1'- 4"
Net length of each room	12'- 2"
Gross volume of center-line room 24'0"x 13'6"x7'4"	= 2376 cu. ft.
Net volume of room without meat rails 22'8"x12'2"x7'1"	= 1946 cu. ft.
Net volume of room with meat rails 22'8" x12'2"x6'6"	= 1792 cu. ft.

Recapitulation:

	Gross	Net
Two outboard rooms without meat rails	9404 cu. ft.	9004 cu. ft.
Two outboard rooms with meat rails	9404 cu. ft.	7476 cu. ft.
One center-line room without meat rails	2376 cu. ft.	1946 cu. ft.
One center-line room with meat rails	2376 cu. ft.	1792 cu. ft.
Totals	23560 cu. ft.	20218 cu. ft.
Equivalent to measurement tons of 40 cu. ft. per ton..		505.5 Tons

Stowage factors, allowing for dunnage and air chan-
nels, are:—

1. Freezer cargo, such as stacked frozen meats, 80 cu. ft. per weight ton.
2. Chill cargo, such as hung carcasses, 160 cu. ft. per weight ton.
3. Chill cargo, such as crated meats, poultry, 100 cu. ft. per weight ton.
4. Chill cargo, such as crated fruits, vegetables, 120 cu. ft. per weight ton.

Therefore, the capacities in weight tons are as follows:

	Freezer (1)	Chill (2)	Chill (3)	Chill (4)
2 outboard rooms without meat rails, total	112.5	56.3	90.0	75.3
2 outboard rooms with meat rails, total	93.4	46.7	74.7	62.3
1 center-line room without meat rails	24.3	12.1	19.4	16.2
1 center-line room with meat rails	22.4	11.2	17.9	14.9

(These calculations, of course, often come first to determine required volume to meet specific needs.)

Calculation of Refrigeration Loads

(Refer to problem as stated)

For purposes of simplification it will be assumed that the insulating value of all surfaces will be equivalent to the following combination of materials:

(The constant in the following table, in each case, is the specific thermal conductivity for the material measured in B.T.U., per square foot of surface, per one-inch thickness, per hour, per degree Fahrenheit difference in temperature.)	
3/4-inch steel	Constant 322.
7-inch granulated cork	Constant .3225
2-inch corkboard	1.045
2-inch Oregon pine	.305

As in Part II, the quantity of heat transferred—

$$Q = \frac{\text{Area} \times \text{Temp. Diff.} \times \text{Time} \times \text{a constant}}{\text{Thickness}}$$

For one square foot, for 1 degree temperature difference, for 1 hour—

$$Q = \frac{\text{Constant}}{\text{Thickness}} \text{ or } \frac{1}{\frac{\text{Thickness}}{\text{Constant}}}$$

and the combined effect of a built-up insulation will then be—

$$Q = \frac{1}{\frac{\text{Th.}}{\text{C}_1} + \frac{\text{Th.}}{\text{C}_2} + \frac{\text{Th.}}{\text{C}_3} + \frac{\text{Th.}}{\text{C}_4} + \dots \text{etc.}}$$

Substituting thickness and constants as above—

$$Q = \frac{1}{\frac{0.75}{322.} + \frac{7}{0.3225} + \frac{2}{1.045} + \frac{2}{0.305}}$$

$$= \frac{1}{0.0023 + 21.7054 + 1.9166 + 6.5573}$$

$$= \frac{1}{30.1816} \text{ or } 0.0322 \text{ B.T.U. per hour per degree per sq. ft.}$$

Area of Surfaces

Vertical surfaces:

$$(60' + 60' + 72' + 72' + 30' + 30' + 24' + 24') \times 9' = 3348 \text{ sq. ft.}$$

Horizontal surfaces:

$$[(60' \times 72') - (30' \times 24')] \times 2 = 7200 \text{ sq. ft.}$$

$$\text{Total} \dots\dots\dots 10548 \text{ sq. ft.}$$

Assuming a 50-degree Fahrenheit temperature difference, the heat leakage will be:

$$Q = 10,548 \text{ sq. ft.} \times 50 \text{ deg.} \times 24 \text{ hours} \times 0.0322 \text{ B.T.U.} \\ = 420,232 \text{ B.T.U. per day}$$

Adding an arbitrary door and ventilation leakage of 50 per cent., the total leakage of heat will be—
 $Ql = 630,348 \text{ B.T.U.}$

Assumed operating conditions require 50 per cent. of the volume as being vegetable chill and 50 per cent. as meat chill.

Hence, $\frac{20218 \text{ cf.}}{2 \times 160} = 63.1 \text{ tons of meat}$
and, $\frac{20218}{2 \times 120} = 84.2 \text{ tons of vegetable}$

Since Quantity of Heat $\times$ Weight $\times$ Specific Heat $\times$ Temperature Difference, the refrigerating load required to lower the temperature of the meat, whose specific heat is 0.77, 30 degrees Fahrenheit, is:—

$Qm = (63.1 \times 2000 \text{ lbs.} \times .77 \times 30 \text{ deg.}) = 2,915,220 \text{ B.T.U.}$; and for the vegetables, whose specific heat is 0.90 and the temperature drop is 20 degrees Fahrenheit:—

$Qv = (84.2 \times 2000 \times .90 \times 20) = 3,031,200 \text{ B.T.U.}$

Then the total heat removal (Qr) will be:—Leakage (Ql) plus heat removal from the meat (Qm), plus heat removal from the vegetables (Qv).

$Qr = Ql + Qm + Qv = 630,348 + 2,915,220 + 3,031,200 = 6,576,768 \text{ B.T.U.}$

Since the refrigeration load was to be based upon a total heat removal in 24 hours, and since One Ton of Refrigeration is equivalent to the effect of the melting of one ton of ice or 288,000 B.T.U. in 24 hours, then the refrigerating load will be—

$\frac{6,576,768}{288,000} = \text{or } 22.84 \text{ tons refrigeration}$

Allowing small (arbitrary) margin for losses in compressor, refrigeration pipe lines, etc., the machinery should be capable of delivering not less than 25 tons of refrigeration, American Society of Refrigeration Engineers' rating.

After the heat of cargo is removed, the major heat

removal will be from leakage and the load should be less than half the above figure. However, the effect of changing sea-water temperatures in the condenser should be carefully determined.

It is suggested that three compressors be installed, two of which will handle maximum load, the third standing in reserve. Auxiliary equipment, such as condensers, should be in like proportion.

Room Coils

Assume that it is required that all rooms are to be equipped with wall coils to carry temperatures varying from 10 degrees Fahrenheit to 40 degrees Fahrenheit. It is recommended that brine circuits be not over 450 feet in length and that direct expansion coils circuits be not over 800 feet in length, and there be not less than two circuits. (Refer to coil curves in Part V.) Pipe dimensions may be found in many handbooks and catalogs.

Ventilation

The larger outboard rooms should have two circulator fans, the center-line rooms but one. With a 6-minute circulation of empty room volume, the outboard rooms will require two 375-cubic feet per minute blowers each and the center-line rooms one 330-cubic feet per minute blowers each.

Brine Pump

If brine is used, a brine pump with a capacity of 200 gallons per minute should be supplied on a basis of 8 gallons per ton of refrigeration. A stand-by unit of equal size should be installed. The ship's service boxes may have an independent brine pump or the cargo pump may be increased in capacity to handle this service also.

In previous chapters will be found sufficient data from which other plants, such as cold air systems, may be designed. It is the purpose of the foregoing calculations to show the fundamentals by which all types and systems may be figured.

(1) Net cu. ft. in rooms	(2) Cu. ft. of space refrigerated by 1 ft. of 1" pipe, direct expansion	(3) Lineal ft. 1" of coils, minimum direct expansion 2.9 ft. per sq. ft. cooling surface	(4) Lineal feet 1½" brine pipe. (125% of cooling surface of column 3) 2.01 ft. per sq. ft. cooling surface			
	10 deg.	40 deg.	10 d.	40 d.	10 d.	40 d.
4502 cu. ft.	3.97	5.70	1134	790	980	686
3738 cu. ft.	3.70	5.40	1010	692	877	600
1946 cu. ft.	2.82	4.23	690	460	600	400
1792 cu. ft.	2.70	4.05	664	444	575	384

Table giving the minimum required lengths of 1-inch and 1½-inch piping for coils in the various compartments and for the two stages of refrigeration.



A NOTABLE VISITOR

The Empress of Britain, flagship of all Canadian Pacific fleets, is now on world cruise and will visit both Los Angeles and San Francisco during March. She is claimed to be not only the last word in luxurious travel, but the most economical steamship afloat.

She is 760 feet 6 inches long, 97 feet 6 inches beam, 100 feet 6 inches depth to top of superstructure. She has a load draft of 32 feet and gross tonnage of 42,500. Service speed, 24 knots. Four screws. Triple-expansion single-reduction-gear turbines. On a seven-day exhaustive sea trial, she burned 0.57 pound of fuel oil per shaft horsepower hour for all purposes.

Pumps for Marine Service

By I. W. Jackman,* O. H. Dorer, H. M. Chase**

Part II—General Characteristics of Centrifugal Marine Pumps

FUNDAMENTALLY the centrifugal pump generates pressure through the change in the velocity of the fluid passing through a rotating member contained inside of a casing. The impeller must be covered with the fluid before any acceleration can take place. Once started, the state of pressure energy continues, but the pump ceases functioning immediately the stream is interrupted for an interval. It will not restart until the impeller is again completely covered by the fluid. For this purpose additional attachments are needed which function to fill the impeller completely by evacuating the air from the pump and permitting the atmosphere to force the fluid into the pump from the supply source. The self-priming pump accomplishes these various functions automatically whenever the prime mover is started.

Whenever the fluid handled tends to vaporize—due to the reduction in pressure which accompanies the velocity with which it enters the impeller—the pump will stop functioning until the flow is started again by external energy. This requires such pumps to be located so that the fluid will automatically flow to the pump. The pumps falling into this group are: (a) Boiler feed pumps, (b) condensate pumps, (c) heater drain pumps, (d) all liquids which are volatile at atmospheric pressure, such as gasoline.

The order of comparative velocities through the various sections of a pump progress respectively as follows, unity at the eye, $2\frac{1}{2}$ to 6 times through the vanes and 6 to 20 times at the discharge, depending on the pressure generated. With such wide ranges in velocity it can be seen that wide range in capacity and resulting pressure are available with a given impeller. A rapid reduction in absolute pressure immediately beyond the eye is caused by the increase in the velocity in the vanes, which is from $2\frac{1}{2}$ to 6 times the velocity in the eye. This zone is the critical one for vaporization and results in certain restrictions in capacity applying to the four classes of pumps enumerated above.

Pumps are definitely classified into types by their specific speed (N_s).

$$N_s = \frac{\text{R.P.M.}}{21.2} \times \frac{\sqrt{\text{G.P.M.}}}{H^{3/4}}$$

Where H = head generated per impeller in feet.

G.P.M. = delivered quantity (gallons per minute).

R.P.M. = rotating speed (revolutions per minute).

Thus it is seen from the formula that the capacity, the speed and the operating stage pressure, defines the centrifugal pump through a type number which is specific speed. The size of the pump does not enter directly. The value of knowing the specific speed is to safeguard against using an incorrect speed for a given service condition, which would result in a pump not

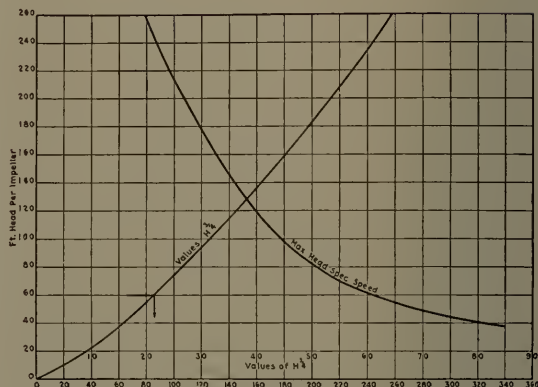


FIG. 1.—SPECIFIC SPEED CURVE.
Double suction pumps. For single suction pumps multiply size speed values shown for given head by .708. Curves based on condition at max. efficiency point.
 $N_s = \frac{N \sqrt{Q}}{H^{3/4}}$, N —R.P.M., H —Head-feet.

standing up to the work for which it was furnished. Fig. 1 shows maximum limit for N_s which should never be above the curve. All reference to specific speed given below are based on experienced use for long life and substantial performance. Although it may be possible to force a pump to greater performance—giving lighter weight construction and smaller machines—due consideration must be given to their service life.

A given pump at constant speed has a maximum discharge where the net head generated is zero. Likewise it can function with zero quantity and practically the maximum pressure of which it is capable. Between these limits there exists a number of capacity and pressure values which, when drawn in curve form, give the characteristic curve. The efficiency is zero at the two limits given above; it likewise is at a maximum at some point between. All rating references, type references, or specific speed references are made where the efficiency is at a maximum. No better way has been found to clearly define and classify centrifugal pumps. The pump manufacturers have rating charts which cover the range of economical use of the pump, both with reference to pressure and capacity for definite speeds. The upper values of operating speed are not always given, due mainly to the inability of motor manufacturers to attain those speeds. Thus the commonly accepted 1700-revolutions per minute motor may connect to a pump of a type that could possibly operate up to 5000 revolutions per minute before exceeding its hydraulic limitations.

With the above, it is clear that quick and easy means of centrifugal pump selection is not possible, and that full dependence on manufacturers' rating charts, backed by full and complete test data records, forms the only sound means for selecting centrifugal pumps. All manufacturers graduate the sizes in such a way that the economical range for one size is immediately fol-

*Manager, Marine Sales, Worthington Pump and Machinery Corp.

**Paper read at Annual Meeting of the Society of Naval Architects and Marine Engineers, November 19 and 20, 1931.

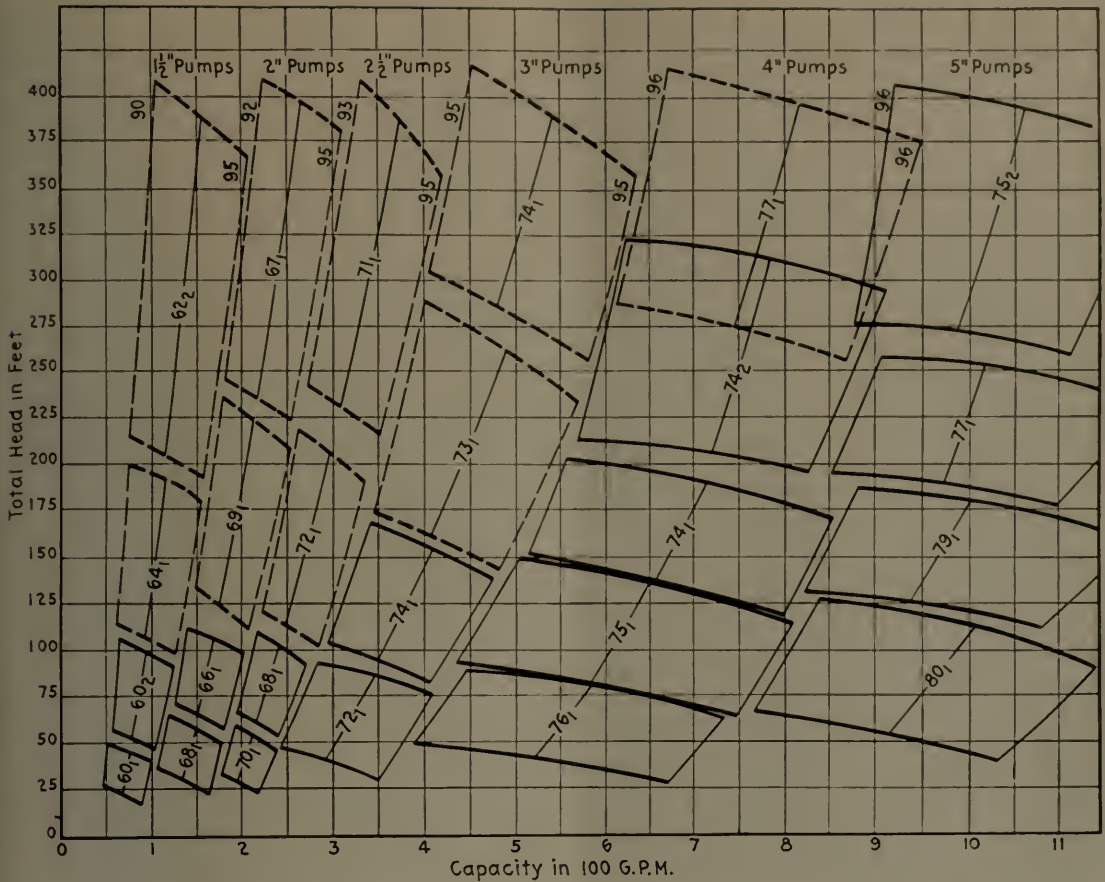


FIG. 2.—TYPICAL RATINGS FOR ECONOMICAL CAPACITY AND PRESSURE RANGES UP TO 400 FEET

Figures (622) denote best efficiency values in percent. Subscripts denote number of stages (622 = 62% efficiency and 2-stage pump. Figures 90-92-95, etc., represent percentage of maximum efficiency. Example: 90% of 62 = 55.8% efficiency, etc. Pumps smaller than 3" usually of single suction type. Solid lines denote 1,750 R.P.M. Dash lines denote 3,500 R.P.M.

NOTE: Several alternate charts showing additional 2-stage pumps at 1,750 r.p.m. may be added to replace some 3,500 r.p.m. performances (usually less efficiency).

lowed by a succeeding size. With fixed motor speeds it is imperative to regulate the amount of head available in a given casing by a similar step process.

A sample chart, Fig. 2, is given to indicate a typical line of patterns necessary to fill a range in capacity between 100 and 1,000 gallons per minute and a range in head from 40 to 400 feet. Some of these pumps are two stage (series arrangement of impellers to double the head). The chart in Fig. 2 also indicates by lines the approximate efficiency values.

Mechanically a speed of 3500 is just as safe as a speed of 1200 or 1700 revolutions per minute. Proper balancing of the rotors and their substantial support by ball or roller bearings satisfactorily solves the problem of high speed. Such units are considerably smaller in over-all physical dimensions, require smaller foundations, and have a lower center of gravity of the rotating masses, all with a mechanical excellence equivalent to the familiar 1700-revolutions per minute unit. There is not much difference in the length of the motor, but it is smaller in diameter and lighter in weight.

All centrifugal pumps have internal running clearance joints whose function it is to minimize leakage from the discharge to the suction spaces of the impeller. Long shafts deflect, due to the weight of impellers and pressure reactions within the casing. These reactions may be upward one moment and downward the next. Consequently, the shaft is subjected to forces frequently overlooked in executing a design of bearing support and type of bearing. The shaft may whip and operate at a critical speed from these different reactions. The solution to the problem is effectively made by employing ball or roller bearings lubricated by grease and cooled by water jackets when necessary. Ring oiled bearings are not particularly successful at 3500 revolutions per minute with a pitching, rolling ship. They require large quantities of oil at high speeds and large bearing clearances. Ball bearings are close clearance devices fundamentally aiding in true running of the shaft in its designed location. The shaft is stiffer by comparison and there is less contacting within the pump at clearance joints. A 10 per cent. saving in

(Please turn to Page 108)

Some New Materials in Shipbuilding

(Continued from January Issue)

By William E. Blewett, Jr.*

Assistant to the President, Newport News Shipbuilding and Dry Dock Company

ALUMINUM and its alloys have been used particularly by the Navy, where weight is a prime factor. Its use as castings is by no means new, but its substitution for joiner bulkheads, furniture, fittings, and nonstrength structural members is comparatively recent; while still more recent is its development for use as strength members.

There are several disadvantages in connection with the use of aluminum which will have to be overcome or allowed for. Oxidation is probably the most serious, and, as most of the common metals are electro-negative to it, particular care must necessarily be taken to locate it in portions of the ship where it will be free from any electrolyte.

Aluminum is easily worked and has a low specific gravity. No casting alloy ordinarily used has a density more than 10 per cent. greater than the parent material, and the alloys with physical properties approaching those of mild steel have an increase in density of only approximately 3 per cent. The wrought metal which is commercially used in the form of plates, bars, wire, shapes, and stampings has a tensile strength of 12,000 to 16,000 pounds per square inch, a yield point of 4000 to 7000 pounds per square inch and an elongation of 30 to 40 per cent. The strong alloys of aluminum have, with mechanical and heat treatments, developed physical properties of 55,000 to 63,000 pounds per square inch tensile strength, 30,000 to 40,000 pounds per square inch yield point, and an elongation in 2 inches of 18 to 25 per cent. The future will probably see the commercial development of aluminum alloys, which, when rolled in the larger structural shapes, will be used extensively, particularly in superstructures.

There is now available an insulating material composed of aluminum foil, shipped in rolls about 16 inches wide and 100 feet or more in length.

The method of application is to crumple the foil as it is unrolled and cut it into about 12-foot lengths; then the crumpled sheets are stretched out, reducing the height of crumpled surface until five sheets laid one over the other will pile 2 inches high. The principle involved is that the resistance to heat passage is due to the reflection from its multiple surfaces. The resistance of this material applied as described is equal to cork board of the same thickness, and it may be used at higher temperatures.

Aluminum foil has a promising quality of durability as it is nonabsorbent and therefore not subject to mildew and decay. It is also noninflammable, which makes it desirable to reduce fire hazard.

The chief advantage of this insulation as applied to ships is that it weighs 3 ounces per cubic foot as compared with cork at 6 to 8 pounds per cubic foot. One disadvantage worthy of consideration in connection with

flooding is that cork allows a permeability of only about 50 per cent., while aluminum foil would possibly run over 95 per cent.

Asphalt Chocks

An investigation of ship repairs shows that concrete chocks in dead waterway spaces do not fully protect the shell clips and stringer angles from corrosion. Apparently the concrete, being inelastic, cracks and breaks away from the frames and shell, permitting the entrance of moisture and thereby not serving the purpose for which it is intended. To better this condition a mixture of gravel and a crude oil by-product is now being tried on the steamship Florida. Experimentation has showed this mixture to good advantage, but since, as in all such matters, its desirability can only be proved by practical application, some time must elapse before definite conclusions can be formed.

The mixture consists of large gravel (3/4 inch) and an asphalt by-product with a high melting point, the gravel first being laid within the space and then the asphalt poured in hot. With the large gravel a good penetration to 6 or more inches is obtained. This composition has a high melting point; namely, 180 to 200 degrees, but weighs approximately 113 pounds per cubic foot as compared with 110 pounds for coke and cement, and costs about 14 cents more per cubic foot.

Structural Finishes

Both the methods and materials used in painting the hull structure have changed in recent years, and, as this is the most important paint job on the whole ship, it is perhaps in order to devote a brief paragraph to both methods and materials, although neither comes within the strict interpretation of this paper.

Formerly, shell plates, when received from the mills, were immediately fabricated and erected without regard to mill scale. If the scale adhered, all well and good, it was supposed to act as a protective coating; but it is now recognized that mill scale is detrimental and not advantageous because it is electro-negative to steel, and the corrosion that results in the presence of an electrolyte soon causes the mill scale to fall off and expose the bare plates. The practice now is to pickle all shell plates before fabrication to get rid of the mill scale, a practice upon which too much stress cannot be laid, for it has the added advantage of showing any plate defects, such as snakes, scabby, bricked, seams, slivers, and so forth. It is perhaps not out of order to prophesy that before many years have elapsed the more progressive rolling mills will pickle all plates before shipment.

After erection the plates are wire-brushed, given a coat of a good grade of red lead, and, when thoroughly dry, a coat of antifouling. However, the treatment of the stern in the vicinity of the propeller should be somewhat different, for here the plates are subject to

*Paper read before the Society of Naval Architects and Marine Engineers at New York, November 20th, 1931.

an electrolytic action from which considerable damage in the form of pitting frequently results. To counteract this there are several anticorrosive compounds which have proved fairly satisfactory, but they are manufactured under trade names and apparently secret formulae, for information relative to their ingredients is not forthcoming. However, the American-made paint seems to have an asphaltum base, while a very good British paint is advertised as having a lead base. As these paints are purely anticorrosive, it is customary to apply the antifouling over them, there being no reaction between the two.

Tank tops, bilges, peak tanks, etc., are coated with a bituminous solution most generally applied hot, but, as in mastic flooring, there are solutions of asphalt emulsions which are obtained in liquid form and applied cold. They contain no volatile solvents and may be thinned to any consistency by adding water. However, like decking, they should be applied at a temperature not lower than 35 degrees Fahrenheit, and air circulation must be provided. A good bitumastic enamel will not slide or run when in a vertical position at a temperature of 225 degrees Fahrenheit for two hours. Before applying a bitumastic solution, whether hot or cold, the plates must be well cleaned. They are usually pickled first to remove mill scale, and just before application of the solution they are wire-brushed and cleaned of all oil, grease, and loose dirt, and, in case of a hot solution, made absolutely free from moisture; otherwise constant trouble can be expected. These solutions have one big disadvantage in that if proper inspection is lacking and application is poor, due either to unfair surfaces or poor cleaning, improper adhesion to the steel is likely to occur, which is a condition that is virtually impossible to detect. The result is that in the course of time water will seep through and come in contact with the steel, causing corrosion which may continue without being detected until the plate is badly weakened.

Alloy Steels for Galleys

A special chromium nickel steel has recently come into use in connection with fittings for galleys, such as steam tables, cold tables, sinks, tables, table and dresser tops, warming ovens, dish-washers, stock pots, and cooking utensils in general. This material has an ultimate tensile strength of 90,000 pounds per square inch and a yield point of 45,000 pounds per square inch. The thermal conductivity is 48 per cent. of that of iron, and it is nonmagnetic. Being an austenite alloy, it is not hardened in cooling rapidly or slowly from welding temperature and may be welded by oxy-acetylene or electric arc, butt or spot methods, also soldered or brazed. It does not contain copper or zinc; therefore, no copper verdigris or oxide of zinc appears to mar the finish or make it unsafe for use in food equipment. Fruit or meat acids do not affect the surfaces, and it is exceptionally resistant to denting and scratching, all of which assures permanency by reason of strength and resistance to rust, wear, and discoloration.

Deck Coverings

One of the most important and carefully selected classes of materials is deck coverings. It is desirable that these materials be relatively light in weight, permit of a reasonable deflection, be easily workable, withstand a fairly high compressive load without permanent distortion, and not cause corrosion when in direct contact with steel.

Magnesite. Perhaps the most common deck covering is that usually used in passenger spaces and known as

magnesite. It is used as a finished floor or as a sub-floor, usually covered with rubber. When laid it should have a minimum thickness over butts and laps of five-eighths to three-quarters of an inch. If rubber is to be applied, the magnesite surface should be absolutely smooth and allowed to dry for twenty or more days; but, if a finished surface of magnesite composition is to be applied, it should be done within twenty-four hours after the first coat has been laid.

Magnesite may now be obtained in numerous colors and applied in almost any simple pattern. The colored composition gives off an efflorescence or whitish bloom on the surface, but this bloom is soluble in water and can be removed by washing or scrubbing with water. However, if it is allowed to remain for too long a time before being washed, it becomes necessary to remove it by means of water and very fine steel wool. In order to make the colors more permanent, a mixture of raw linseed oil and turpentine in equal parts may be rubbed into the floor, but care should be taken that none of it be allowed to remain on the surface. Floor wax may also be used, but neither oils or waxes should be applied until all evidence of bloom has permanently disappeared.

Mastic Decking. There have come on the market within recent years types of mastic decking which are applied cold instead of hot. The base of this mastic composition is an emulsion of asphalt dispersed in water. In some of the emulsions, colloidal clays, soap, or mineral colloids are used to hold the asphalt in suspension, while in others the emulsion is obtained mechanically by high-speed dispersing machines. The mastic composition is made by mixing sand and cement with the emulsion in the approximate proportions of three parts sand, one part Portland cement, and two parts of the emulsion, the sand and cement being mixed together dry and the emulsion added instead of water. The mixing operation may be carried out in an ordinary concrete mixer or by manual labor.

Mastic decking should be applied in thicknesses of one-half to three-quarters of an inch over laps; if applied too thick it is likely to crack in the drying process. It should be applied at a temperature not lower than 35 degrees Fahrenheit and should be provided with ample air circulation for drying. Mastic decking of this type will usually show less surface distortion under load than that applied hot; however, the extent of the distortion depends considerably upon the skill of the contractor in obtaining a correct composition of the aggregate. A good floor should not be too hard, for if so, it is likely to crack at low temperatures; but it should be hard enough to carry a concentrated load of 250 pounds over one square inch of area and not show more than 0.05 of an inch indentation after twenty-four hours, and it should withstand a temperature of 300 degrees Fahrenheit without getting soft, and of 10 degrees Fahrenheit below zero without showing signs of cracks.

Sheet Rubber. The French Line boats, Ile de France, Rochembeau, Paris, and Lafayette, are using a rubber floor made in sheets. The sheets are manufactured in any design or color with a maximum size of 15 feet wide by 75 feet long. The construction of this covering is that of a hard rubber similar to rubber tile on top of a composition best described as being similar to a mixture of crepe rubber and sawdust. This produces a sheet one-half to three-quarters of an inch thick. The crepe rubber underneath the hard surface rubber produces the effect of walking on a heavy matted rug. The

manufacturers claim that this is the only rubber that can be used to advantage in damp locations, but it is not desirable to place this material where it will come in contact with oil.

Imitation Stone. There is a material which is made by compressing wood fiber and calcium magnesium oxide with a weather-proofing binder. It forms a dense block, highly fire-resistant and exceptionally low in absorption, which may be worked similar to wood, does not shrink or distort, and has the added advantage of having a low thermal conductivity. It is made in block form and can be obtained in many colors and sizes, so that virtually any desired pattern can be produced. Aboard ship it is used chiefly as a floor covering, but it may be used as imitation stone in fireplaces, arches, panels, and such locations. It has been installed on the Havana, Evangeline, and Yarmouth.

Galley Tile. The up-to-date galley is also equipped with nonslippery tile floors made up of abrasive aggregates composed of not less than 60 per cent. of the aluminum oxide abrasive in crystalline formation (Al_2O_3), ceramically bonded and vitrified. The structure of the aggregate is homogeneous and rustproof. It may be cleaned with any good cleaning powder or soap and is obtainable in several colors.

Parquet Floors. No modern passenger ship is considered conventionally designed unless its lounge or ballroom is beautified with parquet flooring. Formerly the designs of these floors were comparatively simple, usually herringbone type, but in some of the more recent ships the designs called for are very elaborate. To meet this demand, the manufacturers are now making the parquet patterns in blocks of any size, shape, or woods necessary to fit the design. These blocks are made completely at the factory, usually in the form of veneers, thus having the advantage of eliminating the heavy expense of laying each individual strip separately, and thereby producing a more perfect pattern.

The more common type of block has slip tongue joints and is laid by toe-nailing to the wood subfloor. However, there are some mortised and tenoned hardwood blocks on the market which require no nailing and which may be laid over any level subfloor in a troweled or plastic cement. In the case where the blocks have to be nailed, there is now on the market a cementitious, fibrous compound which is nailable and the holding powers of which are almost as good as that of wood. Such a construction constitutes a saving in cost and weight over the magnesite construction with sleepers and a wooden subfloor.

Composition Materials

Recent years have seen the development of numerous plastic composition materials which have physical characteristics that will permit them to take their places with other building materials and as they become better known will probably find many new usages.

They are made by hot-pressing fibrous materials which have been impregnated with organic binders. Sheets of these materials may be obtained in sizes up to 48 inches by 96 inches and in thicknesses from one-sixteenth to one-fourth of an inch inclusive. They are comparatively light in weight, having specific gravities of approximately 1.4 (one square foot of one-sixteenth of an inch thickness weighs about half a pound) and are much harder than any of the hardwoods. They are ideal materials for marine work, for they are in no way affected by the damp salt atmosphere which so detrimentally affects many of our finishing materials.

Most of the compositions are fire-resisting, will not chip or break, require no finishing or surface treatment, and are good heat and sound insulators. The uses of these compositions are many: veneers for bulkhead panels, tops for all kinds of tables, serving trays, nameplates, radiator cabinet enclosures, door pushplates, etc. Some of these compositions are also molded or worked to form fittings, such as clothes hooks, tapestry hangers, and bathroom fixtures.

Plastic Ornaments

Hand-carved wood moldings or ornamented designs are rather expensive, but for some of this class of work there is a very good substitute now being used quite extensively, the basic material of which is composed of a formula of glue, rosin, and linseed oil mixed in the correct proportions to a dough-like consistency to make a pliable material. This mixture is for small designs which are made in pitch molds. The ornament is applied to the woodwork by a warm steaming method in order to assure perfect adhesion on all sides coming in contact with the wood or the material on which it is to be applied.

For larger designs requiring any considerable thickness of material there is a composition made up of pulpwood mixed with dextrine which is used in both powder and syrup form and produces the necessary hardness. This mixture is heated and poured into a mold made of plasterine for comparatively light designs and of clay for heavy designs. It is also sometimes cast in a glue mold made from caster's flake glue, depending on the type of work being executed. This type of ornamentation is very durable and is nailed in place.

This material should, in all cases, be cemented to bare wood or bare composition boards—that is, free from all prime coats of oil, paint, shellac, or so-called water stains—and should in addition be nailed, the nail spacing being 3 to 6 inches, depending upon the design.

(To be continued)

Pumps for Marine Service

(Continued from Page 105)

length of shaft, plus a saving in bearing clearance averaging 0.003 to 0.005 inch, gives a result equal to double the rigidity and stiffness of shaft.

One of the requirements of successful ball-bearing application is the integral machining of the bearing supports with the internal bores or running fits of the pump. Ample service factors in selecting the size of the bearing for its known duty is of utmost importance.

Grease lubrication, maintained at uniform consistency by water jackets, is superior to oil lubrication. It requires less attention and rather infrequent renewals of the grease. No spilling is possible with the pitching of the ship, and the jacketing further aids uniformity of clearances in the race ways and the uniform functioning of the complete bearing. Some reactions against ball bearings are probably due to unfavorable experiences, but it is likely that the bearing was improperly applied, too small, or of inferior material. There are several distinct types of bearings, each having a field of application, and their selection, to be completely satisfactory, must recognize these features in their entirety.

(To be continued)

Use and Care of the Chronometer

A. S. M. E. Power Test Code Committee Makes Some Land-Lubberly Rules Thereon

FOR some months the Power Test Codes Committee of the American Society of Mechanical Engineers has been working through its various sections to perfect a standardized code for the guidance of engineers in making power tests. One of the sections of this committee has for its study "Instruments and Apparatus." This section has recently prepared a preliminary draft for that part of its final report covering "Measurement of Time." A part of this draft is taken up with the following treatise on the Chronometer as a time measurer.

Since the great majority of chronometers are used on shipboard and since the publication of this preliminary draft is for the purpose of obtaining constructive criticism, we are asking our readers to send us their reaction to these mechanical engineering comments on the "Ship's Time Keeper."

Chronometer

Description. A chronometer is a portable spring-driven clock controlled by a balance wheel. The helical balance spring and spring detent, or "chronometer escapement," is mechanically superior to any other kind, requires no oiling, but is unsuitable to ordinary clocks for if stopped has no tendency to start. It is particularly adapted for use on shipboard, though it may be used in testing on land. It should be moved about only with the greatest of care. As usually constructed, it is about the size of an ordinary alarm clock, being about four inches across. It is usually mounted in a square box on gimbals like a ship's compass, and so remains horizontal whatever the inclination of the ship.

Accuracy. A chronometer may be adjusted to a rate of the order of 0.2 to 0.4 second per day. The error may be kept within 10 seconds per month with only occasional adjustment.

Use. Chronometers may be read in the usual manner from the position of the hands or fitted with electrical contacts.

Care. In order to obtain the best results, it is essential that care and attention to all details be exercised. As far as possible a chronometer should be kept in one location. Hanging of the movement in gimbals keeps it level and improves its accuracy since it is designed to operate in this position. The location should be free from vibration, jars, or violent shocks. On shipboard, it should be placed so that the engine vibrations affect it as little as possible. Magnetic fields should be avoided, and the location should be clean and free from dust.

The rate of a chronometer is affected by variations of barometric pressure, of moisture content of the air, and of temperature. The last is by far the most important. It is usually not possible to control the entire surroundings of a chronometer, but if it is, then the pressure, moisture, and particularly the temperature, should be kept as constant as possible.

For transportation over short distances by hand, the movement should be rigidly clamped in its gimbals, for if left free to swing, its performance may be deranged by violent oscillations. For transportation by express,

the chronometer should be allowed to run down, and should be dismantled and packed by a qualified person. It should be unpacked and put into operation by a qualified person.

All chronometers are wound by key. In the bottom of the brass case is a key hole covered by a dust cap held in place by a spring. In winding, the chronometer should be turned slowly and carefully in the gimbals until the winding hole is exposed. The dust cap is then pulled up and the key inserted. The necessary number of half-turns should be known, so that the last one may be made very slowly and carefully. Some instruments of recent design have a stem-winding and setting device in place of the key; and are often equipped with a winding indicator which gives a warning when winding is nearly completed. For best results winding should be done at the same hour each day, and exactly the same amount of main spring used. After winding, some advocate turning the chronometer slowly until the dial is down, and then returning it to its normal position, on the theory that this redistributes the oil on the pivots in the best manner possible.

Most chronometers are set by means of the key. They should be set no oftener than absolutely necessary, for the pressure of the key and the strain on the time train may change the rate of running. Setting the hands forward should be done slowly and steadily. It is usually said that a chronometer should not be set back. It seems a lot of trouble, however, to set a chronometer ahead nearly twelve hours when it is necessary to set it back only a few minutes. If it is set back, it should be given a quick turn, setting it back more than the desired amount and then set slowly forward to the time desired. A jeweler ordinarily takes the movement out of the case and then stops the balance wheel with a soft brush for the desired time interval. It is better for an inexperienced person not to try this, however. There is ordinarily no method provided for setting the seconds hand, except by stopping the chronometer. To push the seconds hand with a knife blade, for example, is "chronometer murder."

Opinion varies as to how often a chronometer should be cleaned and oiled; the interval recommended varies from two to seven years, although it depends largely on the care the instrument has had.



The Safe Operation of Graving Dry Docks

By Louis J. Lynn

Safety Engineer, Newport News Shipbuilding and Dry Dock Company

THE safe operation of graving docks is a subject confined in general to graving dry-docks as that is the only type we have at Newport News. There are three docks, one 860 feet by 80 feet and two about 600 feet by 70 feet at the bottom of the gate with 25 to 30 feet of water over the sill blocks at mean low water. My experience has been limited to this type of dock, although most of my remarks will apply to any kind of dry-dock. Each of these docks has piers extending into the James River, so that a slip is formed at the gate end with sufficient clearance to handle an ordinary ship, if necessary, between the vessels tied at the piers.

Gas Tests are made on ships before they enter the docks, especially oil tankers, and fuel oil-burning or pulverized coal-burning vessels. If the gas conditions are bad, the vessel is left in the stream until gas free. Vessels are given a second and a more thorough gas examination before any work is allowed to proceed. Our chemist issues written certificates covering the conditions of various tanks and the classes of work that can be done in each compartment. When work is proceeding on ships with tanks not yet approved for hot work a wide yellow stripe of paint is put on the outside of the hull well forward and aft of the compartment and completely around the ship marked "Danger Zone." These rules are very important. They are followed very closely by the company's inspectors or supervisors who are assigned to work on the ship, since in these days of oil-burning and pulverized coal-burning vessels small gas pockets are easily formed which can do a great deal of damage, if neglected, both to the men and to the ship. All-service gas masks are available for the men and are located at convenient places on either side of each dock with extra masks on our fire truck for emergencies.

Handling of the ships into the docks is carried on with extreme care and is done by having a good hawser attached to a winch at the head of the dock. The ship is then held in position by four breast lines while being hauled, one from each quarter, and in case there is a heavy wind blowing, two additional lines are put out on the windward side with sufficient men to handle the lines while snubbing the ship into position. The use of a tugboat attached to stern of the ship on windy days is a big help in order to prevent damage to ship propellers, plating, and the corner of the dock itself. The tug is also important when undocking a twin screw vessel since there is generally very little clearance for the propellers. In docking and undocking vessels where the tide conditions affect the handling, another condition may exist which would prove serious if overlooked; that is, the occasional running of a dock trial on a ship at an adjacent pier.

Ships being docked should be plumb (no list) because the bilge keel will then be clear of the dock and no over-strain will be put on the bilge blocks which might crush them when the dock is pumped down.

Once the ship is in position, she is held there by four sets of block and tackle, one from each quarter, until

the water is pumped out and the ship is resting on the keel and bilge blocks. Since some ships have from four to six foot drag while being docked, our center line of keel blocks contains three sets of cribbing aft with one set forward, so that when the keel of the ship aft is located it will rest on one of the cribbings, preventing the vessel from working aft while it settles down. This also prevents the tipping over or collapse of the center or bilge blocks. These cribs are made of 10-inch by 16-inch by 16-foot white oak longitudinals with 10-inch by 12-inch by 6-foot white oak cross members which give a very rigid foundation. The bilge blocks are movable and adjustable for height, being pulled into place by chains as the vessel settles on the center blocks. At this stage of docking an important precaution to be taken is that there is no obstruction between the vessel and the keel blocks. This is determined by the even settling of the ship on the blocks as the water recedes. Once the vessel is resting on all the blocks, employees attach a brass nozzle to a 3-inch high-pressure salt-water line to wash the side of the ship which has been below the water. This removes a great deal of the sea growth. While they have the nozzle hooked up, they wash down the alters of the dock and the four stairways, two of which are located on each side, removing the slime and mud that is left by the receding water. In this manner we have quite a clean dock and have had very little trouble with men slipping or falling while going to or from their work.

Safety Rules for Docking

There are several important rules that must be observed while docking a vessel, one of which is the removal of bleeder plugs, especially on ships which have been carrying oil that has become mixed with water. This type of drainage will get below the planks of the dock and create a dangerous fire hazard as will the unauthorized pumping of ballast into the dock. Another precaution to guard against in removing the plugs is the extra weight put on the bilge blocks if the plugs are removed from one side of the vessel and a full tank of oil or water is allowed to remain on the opposite side without any additional support under the ship. This condition is sometimes found while testing tanks under pressure and should be avoided if possible as it has been known to cause a lot of damage to shell plates and frames of an oil ship where they drained a full cargo tank on port side and left the starboard tank full without any extra support. This could also happen on a ship with three large boilers, if the crew were to blow down two boilers and leave the third full.

Gangways of Sufficient Size should be provided to all ships in docks. Vessels using fuel oil or pulverized coal should have a gangway forward and aft of the storage compartment on opposite sides, so that in case of a fire or explosion means of escape are provided. All gangways should be kept clear of pipes, hose, and wires, and should be of sufficient strength to support at least three times, or more, the largest deadweight load.

Staging alongside ships in dry dock is of vast importance because of the cost of handling and of the various types used. Our method is to use trestles constructed of heavy lumber for rough hard usage of various heights up to 30 feet with an average of 20 feet. These trestles are handled from the alters of dock by a gang of 4 to 6 men, except in case of a wide ship when it is necessary to remove them from the dock with a locomotive crane. The crane also replaces them as required. Two of the feet of these trestles sometimes rest on the alters while the top rests against the vessel's side with the result that an unequal strain is put on them; hence they must be sufficiently braced to provide for this.

Stage Planks used in the docks are of spruce 3 inches thick, 12 inches wide, and vary in length from 20 to 30 feet. A 24-inch lap over the top of trestles is allowed on each end of plank for springing or creeping. Various trades require different types of staging, inasmuch as we use only a single plank for cleaners and painters and a three-plank stage for riveters when working over 12 feet from the ground. Our swinging stages at present are hung by means of manila rope. When any burning is being done around these stages, a special man is detailed to watch for sparks igniting the ropes or planks. In addition to this, a rigid frequent inspection of all staging is made by the riggers and safety department. We have recently tested the use of 2-inch and 2½-inch spruce stage plank but find them very unsatisfactory because they are limberer and might cause men to fall. We will continue the use of the 3-inch planks because they are quite rigid even with a 26-foot span and two men working on them.

Tank Testing. When any tank testing under water pressure is done, especially in cargo tanks of oil tankers, it is customary to put in an additional row of shoring under the longitudinal about two-thirds of the way from the center keel to the bilge, if the water is to be put in the tank over eight feet in depth.

Anchor. If any work is to be done on the bow of the vessel in dock, or on the anchor windlass, the anchors should be lowered to the bottom of the dock. If impossible to do this, inspection should be made to determine that the windlass brakes are holding, that the chain dog is in place, and that the hooks for the chain are in place if the vessel is so equipped. This is done by our rigger's department, who put a tag on the windlass instructing unauthorized persons not to use the machine.

Isolated Compartments on Ships are considered by us to be enclosed places which the watchman does not visit on his regular rounds. We have issued instructions that all men working in these sections must report to their supervisors before entering and upon leaving, so that there is no chance of a workman being left in them. They also work in pairs or gangs so that there is help available if required in an emergency.

Ventilation. Compartments or tanks in which much work is being done, especially riveting, burning, welding, or heating, should be provided with fresh air from portable blowers under low pressure if possible, or by means of an air jet which can be attached to a high pressure air line so that the air may expand to cover a larger area in the bottom of the tank. Both of these systems are in use here and prove very satisfactory under our conditions. The aim of men working on ordinary repair work is to finish the job with all possible speed which tends toward fatigue. This fatigue may cause other physical conditions to be aggravated to such an extent as to cause a death, thereby placing the responsibility on the company; so extra precautions should be taken during the hot weather to provide as

nearly ideal working conditions as possible.

Temporary Lights installed on repair vessels should be given extra consideration because of the various hazards that exist. The lights should be hooked up and arranged so as to prevent short circuits. Our electric lines are arranged in such manner that the connections are individually fused so that there is no chance of more than 110 volts going through any line.

Supervision of the men on repair work in dry-dock is largely responsible for the accident record of any plant. We have tried to impress on all our men that it is just as important to work safely and without accidents as it is to get the job done. The result of a serious injury may cost more than the profits made on the average ship repair job today, when one considers that prices have been held at very low figures on account of the competition for the work.

Reporting of Accidents and Treatment of Injuries

The following items recently appeared in our plant publication which is issued bimonthly and is given to each employee:

Report Minor Injuries.—When is a slight injury a minor injury? It is a minor injury only when it is taken care of promptly and carefully. The medical department has been having trouble with employees who have not been reporting little bruises, cuts, and scratches which to them seem harmless. They must not decide on these things. Whenever you see blood, you see red, and red is the danger signal the world over. Come to the clinic at once. The management wants you to do this to protect the interests of everybody involved.

Do Not Remove Surgical Dressings.—When an employee goes to the clinic to have a wound dressed, he must realize that this dressing is applied by professionals who make this kind of work their living. The wound is sterilized first and a sterilized gauze bandage is put around it in a scientific manner. This is done in order to avoid any possible infection. Many employees go home and feel a little uncomfortable, perhaps, with the bandage on and remove it. This is dangerous as long as the cut is open and may result even in the death of the person so infected.

Do not remove surgical dressings. Have them removed at the clinic when the proper time arrives. Do not try to dress a wound yourself.

This bulletin contains approximately one page of safety matter each issue. In addition to this we have bulletin boards in all departments on which are shown new posters every week.

Results

The safe operation of our docks during the past two-and-one-half years has decreased the number of our lost-time accidents to 51. This includes the personnel of all trades working on the ships while they were in the docks. The severity of these accidents caused an aggregate of 5815 days lost, according to the National Safety Council scale of charges. The record cannot be figured on a frequency or severity rating, as we do not keep a separate record of the man hours working in the dry docks.

During the two-and-a-half year period mentioned we accomplished an outstanding record in the reconditioning of the passenger and freight steamship President Johnson, of the Dollar Steamship Lines, within forty-one days and without a single lost time accident. The labor price on this contract was nearly a quarter of a million dollars and the job was completed ahead of schedule time.

(Paper read before the National Safety Congress, Chicago, October 14, 1931.)



Marine Equipment

MARINE CORDAGE ~ NEW PILOT SCHOONER
TAIL SHAFT SLEEVES ~ ELECTRIC TELEGRAPH

Developments in Marine Cordage

THE last ten years have witnessed more development in cordage construction from the viewpoint of user value than have accompanied any similar period. The needs of users have been carefully studied. New types of manila rope to meet these needs have been developed.

While this development has been over a ten-year period and many of the improvements are well known to the discriminating user, the advancement in 1931 has not been exceeded by any other year. To thoroughly understand this situation we must learn cause and effect.

Progressive rope buyers in the fishing and marine trade have long felt the need for treated ropes. A treatment that would in the case of the fisherman eliminate the unsatisfactory and costly methods of tanning and application of other preservatives of a similar nature by the user. In the case of the marine trade in general, users have long sought a water-repellent rope, one that would be easy to handle wet or dry.

With the knowledge of these wants in mind, the Tubbs Cordage Company of San Francisco set its engineers at work. Strange compounds, unusual to rope, appeared in the laboratories. The United States Bureau of Fisheries was consulted. Many preparations were tried in laboratory test, theory, and actual practice. Many preparations were found wanting and eliminated. They did not suit the engineers. They were not positive. They only partially accomplished the purpose. At last a simple formula for water-repellent and rot-resistant rope was found. That was three years ago.

In 1931 these ropes were offered to the public. Users may perhaps

wonder at the delay. It was for their protection. The ropes were tried and tested, not superficially but intensively during this period. In theory consultant chemists were asked to find defects. In practice the opinion of certain test users was rendered. The Tubbs Cordage Company was sure of its product before offering it for sale. It was tried, tested, and proved before being put to use in the trade. The net result proved conclusively that the Tubbs chemists had devised a water-repellent mixture that is applicable to all of the highest grades of Tubbs products, whether they contain other treatment or not, without detracting from the strength or durability of the finished cordage.

To render a rope water-repellent, the cells of each individual fiber must be sealed to keep out moisture. They must be sealed with a material that is flexible so that as they change shape under working conditions the sealing material will conform to the situation. This material therefore must be a neutralized water repellent oil with an inherent tendency to cover and cling to these fiber cell voids. This should not be confused with ordinary lubricant put in rope, because it not alone lubricates but at the same time repels moisture.

In repelling moisture the fiber has not the ordinary opportunity to swell. In untreated rope the fiber swells under conditions of moisture, the length shrinks, and the yarns lock into a hard, unmanageable line. A correctly water-repellent rope will not swell greatly and is easy to handle wet or dry. The locking of swollen yarns is minimized and consequently the friction on the line. Friction is wear,

and the line will therefore last longer.

To apply this treatment, we have said, each fiber must be rendered water-repellent. An exterior coating on the yarn, strand, or rope is only a temporary expedient and will soon wear off. The Tubbs method is integral and internal—positive.

As each fiber goes through the preparation machinery it is bathed in the water-repellent lubricant up to the Bureau of Standards' specifications. The cells absorb this lubricant and are scientifically coated and sealed. The process is mechanically controlled so that the resultant rope cannot be overloaded with lubricant or burn out for want of enough. The fiber thus integrally water-repellent finishes its preparation, then is spun into yarn, stranded, and finally layed as rope.

When "Green Rope" or "Fisherman's Brown" are required the process is the same except that a certain portion of the water repellent lubricant is replaced by either copper oleate for "Green Rope" or the special rot resistant preparation for "Fisherman's Brown."

During the process of manufacture the chemists and engineers again enter the picture, this time as testers to assure as nearly as possible manufacturing perfection. As raw products, the fiber and lubricant are tested. Both must be up to exacting specifications. During the preparation of fiber it is tested to make sure that the yarn size will be correct, that the material is thoroughly clean. As yarn, each bobbin is examined for feet to the pound and uniformity of twist. Several bobbins are sampled in each batch for breaking strength of yarn. In the strand, constant ob-

servance is necessary to see that equal yarn tension is applied. The same is true when strands are laid into the finished product. Out of each series of coils manufactured, samples are taken and put to practically every known cordage test. Each tells a story. The rope must be balanced to give maximum efficiency. It cannot have one factor predominate at the expense of others. In addition to tests of the fiber, oil content, breaking strength, it is tested for fatigue or actual wear. All this is done before it reaches the consumer. The chemists and engineers are busy men but they assure users that Tubbs Products are pretested.

What has been accomplished can easily be seen, but let us review some of the characteristics of rope

based upon Tubbs Cordage Company's improvements during 1931.

Water-Repellent

Supercore, Extra Superior Manila, Bolt Rope, Fisherman's Brown, and Green Rope are all water repellent. The absorptive qualities of these lines have been reduced to a minimum. They will not easily swell, kink, or become hard to handle. In fact flexibility, wet or dry, has been assured. Even though the specific gravity of rope is 1.5 so thoroughly have the fiber cells been rendered water-repellent that this product will float a remarkably long time.

In addition to the water-repellent feature, "Green Rope" is thoroughly and integrally treated to minimize the adherence of marine growths to the line. The effect of

copper oleate stifles these growths. The line remains clean and free from fouling for an indefinite period. Where lines are constantly in water its true advantage may be seen.

Fisherman's Brown

Water-repellent "Fisherman's Brown" solves another fisherman's problem. The treatment by this special preparation causes the line to become rot-resistant. Superior to tar, it is fast gaining popularity. It has several distinct advantages.

1. Water-repellent
2. Rot-resistant
3. No added weight

Tarred rope generally weighs ten to twenty per cent. more than untarred rope. "Fisherman's Brown" does not weigh any more. This is an economic advantage.

A New Light Weight Diesel

FOR some years the Bromfield Manufacturing Company of Boston has designed and built and experimented with diesel engines for industrial and marine application. They have, during this time, purchased and tested out several European engines. Late in 1930 they installed a Bromfield-Deutz light-weight, high-speed, diesel in a six-ton truck and operated that truck with inexperienced drivers over all types of rough roads and with loads of from 8 to 10 tons for a period of six months with no troubles, no replacements, no adjustments. They then concluded that they had a good diesel even for the exacting service of propelling pleasure craft or workboats. So they purchased from the navy a heavy launch on which to test this engine at sea.

This 40-foot launch was fitted with a 42-horsepower, 1000 revolutions per minute, 4-cylinder engine with 4 1/2-inch bore and 6-11/16-inch stroke, direct-connected to a Paragon reduction and reverse gear, the entire unit weighing 1875 pounds.

After a number of short trial runs during July, 1931, the goal of 500 hours test running was set and by October 21 the engine had run at full speed intermittently for 486 1/2 hours, running from 8 to 10 hours a day, the only adjustment during that time being the tightening of the gland on the water pump shaft. Some runs were then made at id-



Navy launch equipped with Bromfield diesel.

ling speeds and during all runs at slow, medium, or full speed there was constantly a clear exhaust.

From October 21 to November 2 the engine was run continuously, being moored at night to the Coast Guard houseboat anchored off City Point and being in charge of a young boatman who slept on board and was awakened at stated intervals by the Coast Guard watchman

to check on lubrication. On November 2 the Coast Guard houseboat was ordered off the anchorage for the winter and the nonstop run ended at 288 hours and 50 minutes.

The engine was taken down that afternoon and found in perfect shape with only slight pitting of the exhaust valves and very little carbon.

During this continuous run the engine was operating at 1000 revolutions per minute during the day and at 750 revolutions per minute during the night and used a total of 19-1/8 gallons of lubricating oil at 70 cents and 485 gallons of fuel oil at 6 cents, or a total average cost of 14 3/4 cents per hour.

Ignition takes place in an ingeniously designed precombustion chamber with capacity approximately one-fifth that of the main combustion space. Fuel is injected into the chambers at 1100 pounds pressure by individual cam actuated fuel pumps. The chambers are fitted with electric incandescent plugs for cold starting. On ignition the fuel and flame in finely atomized condition are blown into the main chamber.

As installed, this engine will be started and controlled from the steering wheel just like a modern automobile plant. It is now in production and is available in 2, 4, and 6 cylinder units from 13 to 65 horsepower at 1000 revolutions per minute.

The Pilot Schooner California

THE San Francisco Bar Pilots Association has recently taken delivery from The Moore Dry Dock Company of their pilot schooner California. This beautiful craft, formerly the auxiliary schooner yacht Zodiac, was designed by William H. Hand, Jr. of New Bedford, Massachusetts, and was built by Hodgdon Bros. of East Boothbay, Maine. She is 126 feet 10 inches over-all length, 25 feet 2 inches beam, 98 feet 6 inches water-line length on her original draft of 13 feet 11 inches. As designed and built she was fitted with an Atlas 4-cycle, 6-cylinder, $8\frac{1}{2}$ x 12-inch, 140-horsepower diesel engine, which drove a 54-inch diameter, 2-bladed propeller giving the craft a speed of approximately $7\frac{1}{2}$ knots.

The work of the Bar Pilots of San Francisco Bay requires their boats to be out on the bar in all weathers, and they therefore decided to put more power into this schooner. After considerable dis-

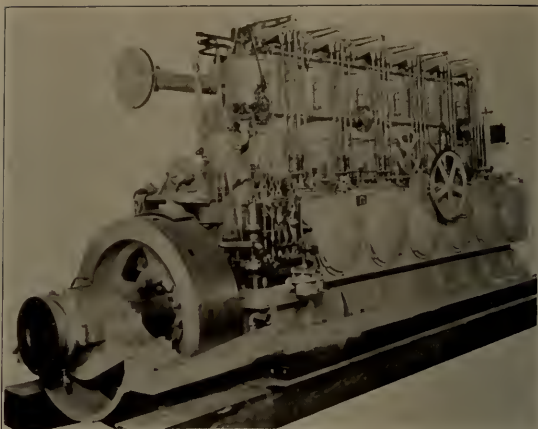
cussion and in consultation with Mr. Hand, a 275-horsepower Atlas-Imperial diesel engine was selected for the job and preliminary plans were drawn up for the necessary changes to the stern to take care of larger shaft and wheel and to the deck houses and accommodations to make her a comfortable sea boat during the long vigils on the bar.

The Moore Dry Dock Company of Oakland secured the contract and, in consultation with Lester Stone, worked out several changes in the proposed alterations which were accepted by the Pilots as being improvements over the original scheme. The inboard profile and plans herewith show the arrange-

ment of the space and the rather unique pilot house effect on the deck structure aft.

The additional weight of the larger engine, plus additional ballast, put the California down to a mean draft of 14 feet 11 inches. At this draft she has a water-line length of 103 feet and a displacement of 245 tons. Her new propeller is 65 inches in diameter, 59 inches pitch, and turns 478 revolutions at normal rating of the engines, driving the hull at 9.73 knots.

It is interesting to note how, with this type of hull, a small change in draft makes very drastic changes in the hull characteristics; as wit-



Atlas-Imperial 6-cylinder 275-horsepower diesel engine as installed on pilot schooner California.



The pilot schooner California on her trials on San Francisco Bay, running 9.7 knots. Note the peculiar deck house aft. The forward end of this structure, shaped like a conventional pilot house, gives a protected look-out station in all weathers. The after part of the structure provides a protected companionway to the quarters below and houses the radio-telephone equipment.



Inboard profile, deck, and cabin plans of the pilot schooner California, as reconditioned by The Moore Dry Dock Company.

ness the following table:

	Before Change	After Change
Draft	13' 11"	14' 11"
Displacement, tons	210	245
Tons per inch draft	3.7	4.4
Block coefficient	.214	.222

In addition to the hull changes, the heating and cooking equipment on the California was given a thor-

ough overhaul and Ingle oil burners were installed on her galley range and in the Arcola boiler of her steam heating system.

The California makes a splendid addition to the Bar Pilots' fleet and her roomy accommodations will be very much appreciated by the Golden Gate Guides.

drops, such as are required for naval vessels, are used for the call indications. Special insulated wire is used for all internal connections to provide against possible service interruptions from grounds and short circuits.

For navigation service on these ships a loud-speaking water tight telephone system is used. This system has at each station a loud talking hand set unit with neat water-tight brass case in which the hook switch and other parts are mounted. The system wiring uses the regular Henschel telephone circuit which, with the special marine handsets, produces exceptional volume with the clarity so essential for navigation service.

The running light tell-tale panel is of the unit panel type using an individual panel for each running light circuit. The first unit type of tell-tale panel was brought out in 1920.

All of these fittings and systems are the products of Chas. J. Henschel & Company, Inc., of Amesbury, Massachusetts, represented on the Pacific Coast by the Lalor Electric & Engineering Company, Ltd. of San Francisco.

Henschel Electric Telegraphs

ELECTRICALLY operated telegraphs of the most modern type are used exclusively for engine order, docking, steering, and fire room signal service on the three new Matson liners. This is the first instance where an American-built ocean passenger liner has not used mechanical telegraph equipment for the engine order system.

The electric telegraphs are of the alternating current synchronous motor type using the Henschel teleindicator units which have unusual sensitivity and great accuracy.

An outstanding feature of the electric engine order telegraph system between the pilot house and engine room is the special selective

arrangement which makes it possible to signal the engine room from any transmitter in the pilot house automatically without the use of manual transfer switches which was heretofore necessary and which was the great drawback to the use of electrical telegraphs in the merchant marine. The automatic selector is an exclusive Henschel feature on which patents have been applied for.

The steward's call bell system is provided with unusually substantial annunciators, the annunciator cases being made of solid hard wood into the covers of which are fitted heavy plate glass windows. Henschel rugged, shock-proof

Sterling Fireboats

Long List of Fire-Fighting Craft, Culminating in New York's Super-Fireboat

John J. Harvey, Use Sterling Engines

GASOLINE - engined fireboats, during the past decade, have become almost standard practice in America. The reliability of the high speed gasoline engine, its light weight for large capacity, and its flexibility make it peculiarly suitable for fireboat use where large pumping power in small space on light draft is the great consideration in choice of power plant.

When added to these considerations, the gasoline engine in this application will show an over-all economy greatly superior to the steam engine, and at least equal to the diesel, there would seem to be very good reason for the popularity the gasoline-engined fire fighter has achieved on so many waterfronts.

In many of these craft, all over America, Sterling gasoline engines are installed and giving remarkable service. Three boats at Portland, Oregon, each have four Sterling

16,000 gallons per minute of water in action. Looking down on the John J. Harvey from George Washington Bridge.



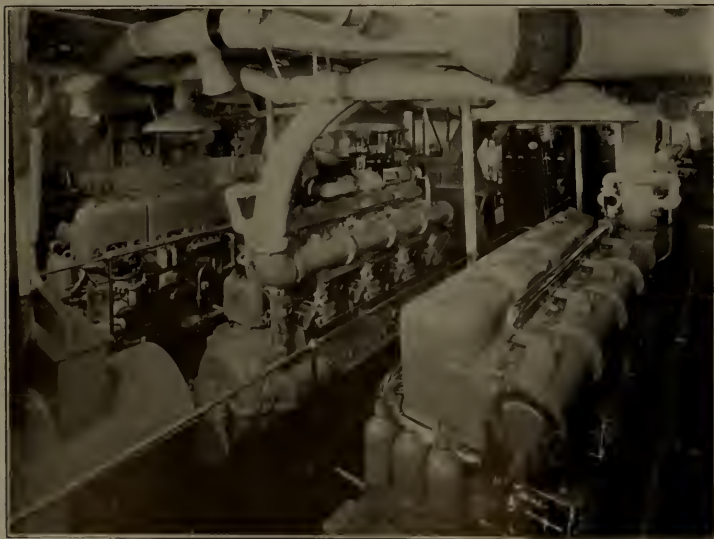
engines; the fireboat at Tacoma has five Sterling engines; the Norfolk, Virginia, fireboat has four Sterling engines; Jacksonville, Florida, has a fireboat with four Sterling engines; Los Angeles has a Sterling-engined fireboat; and Vancouver, British Columbia, has a fireboat with three Sterling engines. All of these boats are giving excellent service. The following story from Portland, Oregon, illustrates

the flexibility of these power plants.

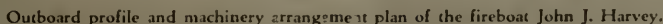
"A test was made by the fire chief as to the ability of the fireboats to get under way quickly and start pumping water at a fire. This test was made in the following manner: The fire chief walked into the engine house where the entire crew was playing cards, told them, without warning, to hop out and get water on the monitors in the middle of the river at full pressure. When he spoke the order to hop out, he snapped a stop watch and the boat was out of the slip in 27 seconds, and was in the middle of the river with all four motors running and full pressure on the pump in 1 minute and 35 seconds. This is extremely fast time when you consider that there were no generators going or motors running at this time, it being necessary to start the Kohler emergency generating sets before the main motors could be turned over."

With these numerous installations all showing good results, it was not surprising that the "greatest fire department in the world," with its expert knowledge of the requirements essential to fighting fire on waterfronts, should choose Sterling engines for the most powerful fireboat in the world, recently completed to serve on the New York waterfront.

This superfireboat, the John J.



The power room of the John J. Harvey, showing three of the five 548-horsepower Sterling Viking II engines.



The Sterling Engine Company is represented on the Pacific Coast by King-Knight Company of San Francisco, who maintain an engineering organization ready at all times to consult with marine users of gasoline engines.

Seamless Sleeves for Propeller Shafting

IN the publicity attending the launching of new ships, little is mentioned concerning the careful selection of certain parts of the hull and equipment which are taken more or less for granted. Each ship is made up of plates, castings, forgings, lumber, and what not—an unlimited selection of materials chosen to function perfectly under all conditions. These items wear, corrode, and require attention from time to time, but are not subject to constant surveillance. They are expected to serve, and their virtue lies in the length of time they may be forgotten.

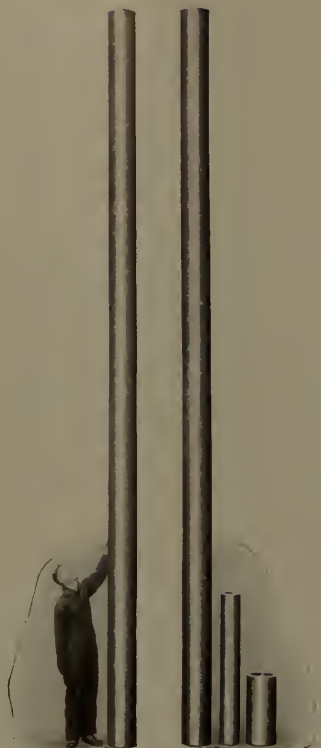
Among these materials is one particular series of special bronze castings. This includes the bronze tail shaft sleeves, stern tube bushings, and other units which act as a bearing for the propeller shaft and protect it from the salt water.

It was not so long ago that these bronze castings could not be forgotten. Twenty years ago the long, sound, one-piece sleeves which are such perfect examples of the advance of metallurgical art were nonexistent. Shipbuilders were forced to rely upon short castings, sometimes soft or porous, fitted together by brazed joints. The castings were not of uniform hardness nor of the best wearing quality. They could neither meet present hydrostatic tests nor serve so long and so well as the present-day materials.

A brazed or welded joint or an imperfect casting is always a point of danger. The slightest fracture or imperfection admits sea water, and immediately an electrolytic action is set up between the bronze sleeve and the steel shaft. This causes serious corrosion, pitting, and eventual fracture of the shaft if not caught in time. Even direct corrosion, in the absence of electrolytic action, can take place and cause damage or require the replacement of a whole section of the shaft.

Such problems, although but a small detail in ship construction and repair, are solved by most builders by using bronze sleeves developed and made especially for this class of service.

These sleeves, as furnished by The Paper & Textile Machinery Company, of Sandusky, Ohio, are made of the highest grade bronze



Long and short centrifugally cast Sandusky sleeves for propeller shafting.

ingot obtainable. An average analysis of the metal usually supplied to shipyards shows about 85 per cent. copper, 6 per cent. tin, and the balance lead and zinc in nearly equal proportions. The tensile strength of this alloy, and of the 88 per cent. copper, 8 per cent. tin, 4 per cent. zinc, U. S. Navy standard may run as high as 45,000 to 49,000 pounds per square inch ultimate, accompanied by an elongation of 35 per cent. to 40 per cent.

Such elastic strength is obtained, to a great extent, by the unique method which the Sandusky firm has developed for casting cylindrical shapes. This is known as the centrifugal process. Instead of using stationary sand or metal moulds, this company pours molten metal into swiftly revolving horizontal machines which form and further refine the fluid bronze to a remarkable degree.

The resulting castings are as

near to being perfect as metal can be and may be made in any length up to 25 feet with the present equipment. Although the usual diameters of sleeves for marine work run from 14 inches to 18 inches, the Sandusky company makes a variety of centrifugally cast products of various nonferrous alloys varying from 4 inches to 46 inches. These are used by manufacturers for cylinder liners, bushings, rolls, and special pipe, tubes, and rings.

The first centrifugally cast marine sleeve was made in Sandusky and supplied by this firm to the Southern Pacific Steamship Co., for the Morgan Line steamer *Excelsior*. Shortly afterward the Newport News Shipbuilding & Dry Dock Co. installed four Sandusky Sleeves on new vessels under construction at Newport News. Since that time The Paper & Textile Machinery Company has devoted a definite portion of its production and research facilities to supply bronze sleeves for the marine industry. Today no architect or engineer would think of using any other than a centrifugally cast sleeve.

The importance which is attached to this class of material is indicated by the fact that both the government and private builders often have inspectors from the American Bureau of Shipping, the Department of Commerce Steamboat Inspection Service, or Lloyds to pass upon the chemical, physical, and hydrostatic tests of sleeves being made at Sandusky. The company's own standards, however, are set to exceed existing regulations.

By continually co-operating with shipyards, the company often saves the builder enough in drydock charges to pay for new sleeves several times over. This is accomplished by using modern forced-heat ovens for drying the centrifugal machine molds and special lathes for high-speed machining operations. These improvements enable the company to cast and ship a completely machined sleeve within 24 to 36 hours.

Such, in brief, is a description of one of the many less known of the products which enter into the construction of a modern ship. It emphasizes the important function of such material and the painstaking care devoted to its development.



American Shipbuilding

Edited by H. C. McKinnon

SANTA ROSA TO BE LAUNCHED

AN American-built liner, whose construction called for the efforts and ingenuity of leading craftsmen in more than forty states in the Union and the first of four sisterships now building, the Grace Line's S.S. Santa Rosa will be launched on March 24, from the ways of the Federal Shipbuilding & Drydock Company, Kearney, N. J. The other three liners are to be christened Santa Paula, Santa Elena, and Santa Luisa.

These four vessels represent one of the most important shipbuilding programs in America today. Their construction means much to this country's business life, as more than 90 per cent. of the total of \$19,000,000 will have been distributed to thousands of workers in more than forty states throughout the country when these ships are completed.

Built for the California, Central American-New York fast passenger and freight trade of the Grace Line's Panama Mail service, the four new "Santa" ships when all are commissioned, will be the finest liners of their type afloat and the most luxurious of any in this trade.

All the skill of American shipbuilders has been brought into service in their construction. The foremost architects, the finest marine engineers, decorators, artists and skilled mechanics have been commanded to bring forth what officials of the Grace Line planned three years ago—the building and placing in their Panama Mail Line service four of the finest liners sailing any ocean, under any flag.

Gibbs & Cox, among the world's foremost "pattern makers" of ships were the architects. To fashion the "brain-child" of Grace Line officials, their foremost experts were assigned to the task, and the result has been, unanimously agree shipbuilding experts, a quartet of vessels without peer in the United States or any part of the World.

Briefly the dimensions of the ships are: length, 508 feet; width, 72 feet; displacement, 16,000 tons.

The vessels are designed for 18 knots sustained sea speed with a



An artist's drawing of the liner Santa Rosa as she will appear when completed.

top speed of 20 knots.

Accommodations for 222 first class and 64 third class passengers have been arranged for each ship. Safety provision excels all requirements of the International Convention for Safety of Life at Sea. Radio, navigating and life-boat equipment will be of the most modern type.

The main dining saloon will be a spacious room, two decks in height and of Spanish-California architecture. A feature of the room will be the "rolling dome" which can be opened at will, thus affording an open sky effect.

A swimming pool of generous dimensions built in the open air and surrounded with sandy beaches and waving palms; an unobstructed sports deck, entirely free for all kinds of pastime; a children's playground and general recreation center are other allurements to the prospective sea voyager.

For the first time in construction of an American liner, these vessels will have each first class room with private bath and toilet. Also, all cabins will be full size outside rooms.

Among the numerous other first class public features will be a spacious library, writing room, lounge, palm garden, veranda night club,

foyers and a standing bar. A complete projection room for the presentation of talking pictures will be installed.

New Stern Frame. — Drydocked at Portland February 18th, motorship West Honaker showed a broken stern frame. Promptly Commercial Iron Works forged a new steel frame and West Honaker was on berth loading cargo with very little delay.

Fore River Launches Quirigua. — Christened by Mercedes Susie Doswell, daughter of Claude D. Doswell, vice-president in charge of transportation steamship Quirigua, fine cargo and passenger liner for the United Fruit Company was launched on Feb. 6th at the Fore River plant of the Bethlehem Shipbuilding Company, Ltd. Quirigua is one of a fleet of six new vessels of which Bethlehem is building three and Newport News three. Others are Talamanca, Segovia, Chiriqui, Antigua, and Veragua. All are equipped with Babcock and Wilcox boilers, General Electric Co.'s steam turbo electric propulsion machinery, and very complete arrangements for cooling, ventilating, and handling bananas.

Talamanca was delivered by

Newport News in December, 1931, and a complete illustrated description of this vessel appeared in the January, 1932, issue of *Pacific Marine Review*. Segovia was burned at the outfitting dock in Newport News Yard shortly before her delivery date. Chiriqui will be delivered from Newport News during March. Antigua was launched at Fore River early in February and will have her sea trials during March. Quirigua and Veragua will be ready for delivery early this summer.

Manhattan Nearing Completion.—At the yards of the New York Shipbuilding Company, Camden, New Jersey, the 30,000 ton liner Manhattan is approximately 80 per cent. complete. Machinery is all in place, passenger accommodations are well advanced, electric fittings are installed in the galley, plumbing fixtures in the staterooms, and work on installation of panelling and interior decorations is going on in the three dining rooms. She will enter service on the New York-Channel Ports-Hamburg service of the United States Lines. Over 1800 workmen are busy on S.S. Manhattan.

Hull No. 406 on Schedule.—At the same yard construction of the Manhattan's sister ship, now known as Hull No. 406, is up to schedule.

Eighty-seven per cent. of the total steel has been erected, namely 12,998 tons, which goes in at the rate of about 500 tons per week. Part of this weekly total includes some 136,000 rivets. The total number of rivets which will go into the hull of No. 406 is almost three million. To date 2,214,992 have been driven home.

Reconditioning Program. Contract has been let to Federal Shipbuilding & Dry Dock Company for the reconditioning of five freighters of the American Diamond Lines, Inc. These ships will be increased in speed from 10 knots to 14 knots. The after ends of these vessels will be completely rebuilt and rudders of new design fitted. New machinery will be installed. All five are to be finished during 1932. After this reconstruction is complete the firm plans to build five new 16-knot cargo vessels. The total cost of this program is figured at \$12,000,000. This work is being done with the assistance of Shipping Board loans, and with the encouragement of a mail contract on the Antwerp-Hamburg service operated by the line.

AID FOR PACIFIC COAST SHIPBUILDERS

ENCOURAGING to lean Pacific Coast shipbuilders is the wide spread approval of the Carter Bill. This legislation, if passed, would grant a reduction of one half of one per cent. on the interest rate charged for Shipping Board loans on new construction, if the ships are built in Pacific Coast yards. It is figured that this will allow Pacific Coast shipbuilders a leeway of approximately 4 per cent. in estimating on any contract and so place them on a much more equal footing with Atlantic Coast yards.

A recent approver was the Fifth National Merchant Marine Conference meeting at Washington, D. C., with delegates from all American Ship Owners Associations and from nation wide organizations of exporters, importers, and shippers.

Shipbuilding is a great cure for unemployment blues. For a given amount of product value shipbuilding employs more labor than any other industry.

Pacific Coast shipbuilding is very lean these days, particularly in the commercial shipyards.

At Bremerton Navy Yard there are under construction a light cruiser and a torpedo boat destroyer; at Mare Island a light cruiser. Aside from this Naval construction there are two fairly good commercial jobs at the shipyards and a lot of fishing and pleasure crafts at the boat yards.

Berg Shipbuilding Company will deliver the North Star to the U. S. Department of the Interior about the end of March and that will leave commercial shipbuilding ways on the Pacific Coast practically bare.

However, we must not forget that at the present time several of the Atlantic Coast shipyards are also practically idle and that were it not for the faith and vision of the ship owners of the Pacific Coast several more Atlantic Coast shipyards would be in that condition. Approximately 65 per cent. of the tonnage now under construction in American shipyards is either for Pacific Coast ownership, Pacific Coast operation, or financed by Pacific Coast operators.

The most important piece of shipbuilding on the Pacific Coast is the wooden hull passenger and cargo motorship North Star, being built at Berg's yard, Seattle, for the Bureau of Indian Affairs, Department of the Interior. 210 feet long, 41-ft. beam, and 16-ft. draft, this ves-

sel will be powered with a 1500-H. P. McIntosh & Seymour Diesel, which will drive her at 14 knots.

The Shipping Board Loan Fund, under the Merchant Marine Act of 1928, was increased to \$250,000,000. Of this amount \$152,000,000 has been loaned or tagged for future loans. There is still approximately \$100,000,000 to be devoted in loans for the encouragement of American shipbuilders. This means that with the assistance of this fund there are still possible additional shipbuilding contracts to the total amount of approximately \$135,000,000.

A VALUABLE RUBBER COMPOUND

THE value of rubber as a protection against abrasion and against the action of sea water and other corrosive agents has long been recognized. Until recently, however, the application of rubber to steel or other metal surfaces has been practicable only with the aid of heat, pressure, and rather elaborate machinery.

A few years back, the Colvulc Rubber Company of Boston, after many years of experimentation, brought out Colvulc—a rubber compound which successfully cures itself on exposure to the atmosphere. At the same time this firm developed a successful priming coat, the application of which to clean metal surfaces causes the subsequent coats of Colvulc to adhere perfectly.

These compounds immediately made possible many useful marine applications for rubber protective coverings, the expense of which under the old methods would have been prohibitive. So reasonable, indeed, is the cost of this material and its application that some ship operating companies have actually used it as a bottom paint on vessels where the corrosion and fouling problems were particularly severe.

The problem of keeping a clean bottom is solved for the life of the ship by the use of Colvulc, barring strandings or collisions.

This material is fully guaranteed by the manufacturers. It will not crack, chip, or blister. It is not affected by heat or cold, expansion or contraction. It has a high resistance to the passage of electric currents. It is water-proof, moisture-proof, and corrosion-proof.

The Colvulc Rubber Company is represented on the Pacific Coast by the J. A. Kinkead Company of San Francisco.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of February 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W., Seattle, Wn.

North Star, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Bell St. Terminal, Seattle, for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1500 H.P. McIntosh & Seymour diesel eng.; 14 knots speed; launched 1/18/32; deliver 3/32 est.

GENERAL ENGINEERING & DRY DOCK CO.,

Oakland, Calif.

Purchasing Agent: A. Wanner.

Marshall C. Harris, hull 26, suction dredge for American Dredging Co., San Francisco; 150 L.B.P.; 45 beam; 12 depth; keel 11/23/31.

U. S. NAVY YARD,

Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long; 35 knots speed.

U. S. NAVY YARD,

Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: str. Kekoskee, str. Gatewood, str. Dorothy Alexander, str. Angel Island, U.S.S. Maryland, str. President Van Buren, str. Point Brava, str. Yarraville, tug F. A. Douty, U. S. S. Pennsylvania, U. S. S. Oklahoma, str. President Garfield, str. Veno, str. Bettendorf, str. Vacuoline, str. President Hoover, str. Emergency Aid, fireboat David Seaman, ferryboat Golden Age, m.s. California Standard Repairs to telemotor: m.s. Finnanger Repairs to starboard M. E. bearing str. President Wilson. Engine repairs: m.s. Soverash. Caulk leaky rivets: str. Alamar. Braze 1 copper pipe: str. Royal Star. Repairs to copper expansion bend: str. Mojave. One C. I. propeller: str. Korri. III Repair rudder, str. Richmond. Misc. repair: launch Columbus, m.s. Wilverlow, str. Ranella, str. Limon, str. Admiral Misser, str. President Wilson, str. Point Brava, str. Talamasca, U.S.A.T. St. Mhiel, str. Saranacca, str. Mariposa.

LAKE WASHINGTON SHIPYARDS, Seattle, Wn.

Remodeling and installing new diesel en-

gine: ferry Chippewa.

Hull and engine repairs: ferryboat Quil-layute.

THE MOORE DRY DOCK CO.,

Oakland, Calif.

Drydock and repairs: barge Yankee, str. Lake Frances, str. Astrild, str. Dorothy Win-termote, str. Nevada, str. Kentuckian, str. Saginaw, ferry str. Calistoga, str. Mauna Ala, barge Western Union Cable Co., str. Iowan, str. Griffdu, tanker Frank H. Buck, str. Golden Star, tanker Plume, str. Panaman, dredge Richmond.

PRINCE RUPERT DRYDOCK & SHIPYARD,

Prince Rupert, B.C.

Docked, cleaned, painted, annual over-haul of machinery, boilers, and hull; re-nued two tail shafts and two tube shafts; misc. hull repairs: str. Prince George. Docked, cleaned, painted, misc. hull and machinery repairs: 6 fishing boats. Misc. hull and engine repairs: 41 fishing boats.

U. S. NAVY YARD,

Bremerton, Wn.

Misc. repairs and docking: Colorado, Texas, Dent, Roper. Misc. repairs inci-dental to operation as district draft: Maho-pac, Tatnuck, Swallow, Challenge, Paw-tucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS

Bath, Maine

Aletes, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 BHP Bessemer diesels; keel 6/10/30; launched 4/10/31; delivered 1/15/32.

Daphne, hull 149, twin screw, steel patrol boat for U. S. Coast Guard; 165 ft. long; diesel eng.; keel 5/9/31; launched 1/6/32; delivered 1/15/32.

Calvinso, hull 150, same as above; keel 5/14/31; launched 1/27/32; delivered 2/12/32.

Hermes, hull 151, same as above; keel 5/20/31; launch 2/23/32 est.; deliver 3/9/32 est.

Icarus, hull 152, same as above; keel 7/22/31; deliver 4/3/32 est.

Perseus, hull 153, same as above; keel 9/15/31; deliver 4/28/32 est.

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,

Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland light cruiser CL-33, same as above; deliver 8/15/32 est.

Monterey, hull 1441, steel express pas-senger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 10/12/31.

Lurline, hull 1447, sister to above.

Antigua, hull 1444, passenger and re-frigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed. 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 11/28/31.

Quirigua, hull 1445, sister to above; launched 2/6/32.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORP., LTD.,

Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co.; 262x45x15 ft., McIntosh & Seymour diesels; launched 11/5/31.

COLLINGWOOD SHIPYARDS, LTD.,

Collingwood, Ontario

Purchasing Agent: E. Podmore. Wm. J. Stewart, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.; keel 8/12/31.

DEFOE BOAT & MOTOR WORKS

Bay City, Michigan

Purchasing Agent: W. E. Whitehouse. Not named, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W.T. boilers; keel 12/15/31 est.; launch 4/15/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY,

Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U. S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hull 1134, one 24-in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept.; 115x28x7'6".

Hull 1137, one steel hull cattle barge for Jersey City Stockyards; 210 x 36'6" x 8', 1410 gr. tons.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self propelled, 16-inch suction, pipeline dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May 32 est.

**FEDERAL SHIPBUILDING & DRY
DOCK COMPANY**

Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'11" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launch 3/24/32 est.

Santa Paula, hull 122, sister to above; keel 8/4/31; launch Apr./32 est.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel Feb./32 est.

**HOWARD SHIPYARDS & DOCK
COMPANY,**

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Mark Twain, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launched 8/29/31, deliver 2/6/32.

Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft., deliver 8/32 est.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Five cargo barges for Inland Waterways Corp.; 230 x 45 x 11 ft.; 3 delivered.

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6".

Captain William Clark, same as above
One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9".

MIDLAND BARGE COMPANY,
Midland, Penn.

Eight floating steel caissons for Foundation Co.; 6 delivered.

Two steel barges, for U. S. Government, 40 x 14 x 3'6".

One towboat hull for Earl Webster.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 260, dredge for stock; 140 x 36 x 9'; keel 11/16/31; launch 1/11/32 est.

Hull 261, gasoline engine workboat for U. S. Engineers, Vicksburg; keel 3/16/32; launch 5/2/32.

Hull 262, same.

Hull 263, same.

Hull 264, work boat for stock gasoline engine; keel 3/1/32; launch 4/6/32.

**NEWPORT NEWS SHIPBUILDING &
DRYDOCK COMPANY**

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City

Chiriqui, hull 346, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 4/27/31; launched 11/14/31; deliver 6/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31.

Not named, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/29/32 est.; launch 8/32 est.; deliver 12/1/32 est.

Not named, hull 348, sister to above;

keel 4/32 est.; launch 7/32 est.; deliver 12/15/32 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31, launched 1/9/32; deliver 5/32 est.

Acadia, hull 351, sister to above; keel 8/31/31; launch 2/13 est.; deliver 6/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO.,
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31; deliver in fall 1932.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launched 12/5/31; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31; launch 9/32 est.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collision.

Walter Wyman, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor; keel 8/1/31; launched 11/5/31; delivered at Staten Island 1/29/32.

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.; 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng.

**SUN SHIPBUILDING & DRY DOCK
COMPANY,**
Chester, Penn.

Purchasing Agent: H. W. Scott.

Mercury Sun, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; delivered 12/15/31.

Not named, hull 146 single-screw steamship for carrying loaded railway cars for Seatrains Lines, Inc., New York and New Orleans; 464'6" by 63'6" by 38'3"; 15½ knots speed; 8500 D.W.T.; keel 2/15/32 est.

Not named, hull 147, sister to above; keel 2/23/32 est.

UNITED DRY DOCKS, Inc.,
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launched 10/7/31; deliver 3/1/32 est.

Hull 806, barge for Berwind-White Coal Mine Co.; 130 L.O.A.; 35 beam; 12'6" depth; keel 12/28/31; launch and deliver 3/1/32 est.

Hull 807, scow for City of New York; 70 L.O.A.; 30 beam; 7'6" depth; keel 1/18/32; launch and deliver 3/1/32 est.

Not named, hull 808, ferryboat for M.d. Hudson Ferry Co.; 64'10" L.O.A.; 29' beam; 8'6" depth; 70 H.P. diesel eng.; keel

2/3/32; launch 3/8/32 est.; deliver 3/15/32 est.

Not named, hull 809, sister to above; keel 2/10/32; launch 4/5/32 est.; deliver 4/15/32 est.

Trade Notes

Distribution Department Formed.

—A Distribution department has recently been added to the commercial department of the General Electric Company to take charge of the finished stock of all products exclusive of those of the Incandescent Lamp, Electric Refrigeration, Merchandise, and Plastics departments. This new division will be headed by J. V. Anthony, formerly connected with the San Francisco office, as manager, and Hancock Griffin, former supervisor of district stocks and warehouse, as assistant manager.

In addition to the handling, warehousing, shipping, and billing of finished stocks, both at the various works and at the sales warehouses, the Distribution department also has the function of studying methods and inaugurating changes in procedure for the purpose of providing the best possible service at minimum expense.

Sales Representative.—Of interest to West Coast marine field is appointment of the Baird-Andrews Company, 16 California Street, San Francisco as sales representatives for Pacific for products of Hunt-Spiller Manufacturing Company of Boston. This product, used by approximately 85 per cent. of railroad companies, is particularly adaptable to marine use, its high wearing qualities making it desirable for diesel engine sleeves, piston rings, cylinder liners, piston heads, etc.

Pacific Coast Distribution.—The Waterbury Company, rope manufacturers, through Warren Taylor, Pacific Coast representative, announces that stocks are now complete at major Pacific Coast ports. Haviside Company, 56-62 Steuart Street, San Francisco, is Northern California distributor. In Seattle, Waterbury products are distributed by Mill & Mine Supply Company, 2700 Fourth Avenue, South; in Portland, by Mill & Mine Supply Company, 781 York Street; and in southern California, by the San Pedro Rubber & Supply Company, 424 South Palos Verdes, San Pedro. And by the Petroleum Equipment Co., 2800 South Alameda St., Los Angeles.



Marine Insurance

Edited by James A. Quinby

The Uniform Bill of Lading

A Discussion of the Status of the So-Called Hague Rules

INTEREST in the adoption of the uniform bill of lading by American carriers was recently given a new impetus on the Pacific Coast by an address delivered before the Association of Marine Underwriters of San Francisco by Ira S. Lillick, well known admiralty attorney and an advocate of the modern contract of carriage. Mr. Lillick's talk dealt largely with the political status of the White Bill, a measure now pending in Congress for the ratification by the United States of the Hague Rules and with the prospects of universal adoption of the measure by other nations. For the benefit of those who are not familiar with the details of the proposed bill of lading, we offer a few informal comments in the hope that they may illustrate the difference between the new form and the types of contract now in use.

Most of the benefits guaranteed to the shipper by the Harter Act are retained by the new contract. The necessity of proving due diligence to provide a seaworthy vessel is specifically set forth, and the carrier, as under the Harter Act, has the burden of proving such due diligence whenever the loss results from unseaworthiness. The freedom from liability for acts or defaults of the master or crew in the navigation or management of the ship is clearly retained, as well as the freedom from liability for fire unless caused by the actual fault or through privity of the carrier.

Time Clauses

Under the present heterogeneous bills of lading in use by carriers, the cargo owner, or other direct or indirect parties to the bill of lading, is placed at a great disadvantage in protecting claims against the vessel. Various bills of lading customarily contain clauses requiring that notice of damage and notice of claim be filed with the carrier or his agents within periods varying from twenty-four hours to six months. The consignee seldom checks these requirements carefully, and many equitable claims are defeated by the lapse of some stringent and highly technical requirements for the filing of claim. Even if claim is properly filed under one of the various types of contract now in use, the claimant may be prejudiced by the lapse of the time to

Lament

When I'm ashore I hanker for
The smell of the open sea
I crave the feel of a tilted keel,
That plunges wild and free,
And the very thought of my landsman's lot
Is anathema to me

But the life of man is an empty span
And his vaulting ambition is vain—
All my fancies depart when I actually start
For a cruise on the bounding main,
And my salt water thrill makes me damnable ill,
So I always return on a train

J. A. Q.

sue as set forth in his contract. The time to sue in American bills of lading varies from thirty days to infinity, but few of them fall within the latter classification. There is really little hardship imposed upon a cargo owner if he is required to sue within a reasonable time, say 90 days, but the difficulty is that no two bills of lading now contain the same suit clause, and cargo interests are prejudiced by the resultant lack of uniformity. The Hague Rules, in substance, provide as follows.

"Unless notice of loss or damage and the general nature of such loss or damage be given in writing to the carrier or his agent at the port of discharge before or at the time of the removal of the goods into the custody of the person entitled to delivery thereof under the contract of carriage, or, if the loss or damage be not apparent, within three days, such removal shall be prima facie evidence of the delivery by the carrier of the goods as described in the bill of lading. The notice in writing need not be given if the state of the goods has at the time of their receipt been the subject of joint survey or inspection. In any event the carrier and the ship shall be discharged from all liability in respect of loss or damage unless suit is brought within the year after delivery of the goods or the date when the goods should have been delivered."

It will be noted that the failure to give notice under this provision results only in the establishing of a prima facie proof that the goods were delivered in good order and condition. Any evidence to the contrary will overthrow this prima facie proof and enable the cargo owner to proceed against the vessel to recover the damage. It will thus be seen that the requirement of notice is really a nullity in any cases where actual damage exists.

The provision that the notice in writing need not be given if a joint survey or inspection has been held is intended to erect an absurd result of the law affecting present bills of lading, which has arisen from a series of decisions holding that the carrier, although he has by his own surveyors and agents examined goods which are known to be extensively damaged, may, nevertheless, set up the lack of written notice as a defense to the claim for damage.

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Fireman's Fund Announces New Marine Secretary

THE retirement of A. W. Follansbee, Jr., which is announced by the Fireman's Fund Insurance Company, removes from marine insurance and shipping circles, a familiar and highly respected figure. Mr. Follansbee retired on February 1 after forty-one years of service with the Fireman's Fund. He will be succeeded as Marine Secretary by George Jordan, who has been manager of the company's Atlantic Marine Department in New York.



A. W. Follansbee, Jr.

Mr. Follansbee is a grandson of Captain A. W. Follansbee who, as skipper of the barque Greenfield in 1855, loaded the first consignment of California wheat for export. Mr. Follansbee was elected Marine Secretary of the Fireman's Fund in 1911.

Mr. Jordan is also well known in this market, having been Assistant Marine Secretary in San Francisco from 1923 to 1929.



George Jordan

Mr. Jordan has been connected with the Fireman's Fund Marine Dep't since 1907, having entered the marine insurance business in London five years previously with a prominent brokerage firm at Lloyd's. He has been manager of the Atlantic Marine Department since 1929.

The one-year suit clause proposed by the Rules is eminently fair to both parties and will do away with the uncertainty now prevailing as to the necessity for suit and the legality of varying time requirements incorporated in the present bills of lading.

Other Differences

Under the rules of law as applied by American courts to bills of lading now in use, a shipper of cargo, to support a claim against the vessel, must prove that the goods were in good order and condition at the time they were shipped. In certain instances the bill of lading itself has been held to be a sufficient prima facie proof on this point, but in other cases the cargo claimant has been penalized for his failure to take costly steps to produce proof of a self-evident fact at some distant port. Under the uniform bill of lading, it is provided that the document itself be prima facie evidence of the receipt of the goods in apparent good order and condition.

The new bill of lading makes a slight change in the rules regarding deviation. Under the present law, a vessel which deviates from its advertised or customary course is thereafter liable to its cargo as an insurer. This rather harsh rule is modified by the new contract to provide that any "reasonable deviation" shall not be deemed to be an infringement or breach of the contract of carriage. This provision, in effect, will leave to judicial decision the question of whether or not a given deviation is reasonable. In any event, it is clearly more favorable to the carrier than the present rule.

The new bill of lading provides that neither the carrier nor the ship shall be liable for loss of or damage to goods in excess of five hundred dollars per package unless a higher value shall be declared by the shipper. Present bills of lading limit the value for which the ship may be liable to as low as fifty dollars per package. Inasmuch as any limitation whatever is in the nature of a mere technical lessening of a ship's liability, it is submitted that the new figure is purely a step in the direction of both uniformity and equity.

Legislation approving the uniform bill of lading has been passed by Belgium, Great Britain, Italy, Holland, Spain, and Hungary. A great number of other nations, including France, Germany, Japan, and the United States, have at various times approved the measure by the signatures of their representatives, but until the governments of these countries formally adopt the measure it cannot be put into effect. The United States remains the chief stumbling block to the universal adoption of The Hague Rules. Successive bills similar to the present White Bill have been introduced in Congress and have heretofore failed to pass. This failure has been due in a large measure to the opposition of certain ship-owning interests and to the opposition of

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the meat packers of the country. The latter group has now withdrawn its objections to the bill, and a concerted effort is being made to convince the ship-owning fraternity that their objections would be more than outweighed by the benefits which would follow the adoption of the uniform bill of lading. From a brief survey of the differences between the present types of contract and the new form, it is difficult to understand the sustained objection voiced by the ship-owning interests.

Liability of Lighters

CARGO owners and underwriters on the Pacific Coast are continually confronted by problems involving shipments to ports in Mexico or Central America which have no dock facilities for large vessels. It is customary at such ports to convey goods to shore in lighters; and damage to cargo while in lighters results in conflicting charges of liability. The decision in *Continental Insurance Co. vs. Anchor Line, et al.*, 53 Fed. (2d) 1032, is applicable to typical Pacific Coast lighterage cases.

In that case, the Anchor Line steamer *Castalia* delivered to a lighter owned by Cory Bros. & Co., 57 bales of cotton goods, which the lighter received at Port Said for shore delivery. Due to the unexplained sinking of the lighter, the goods were damaged. The owners of both the *Castalia* and the lighter denied liability, and the battle was on. The following extract from the opinion of Judge Galston, of the Federal District Court in New York, sets forth the law involved:

"The bill of lading provides for delivery 'from the ship's tackles (where the ship's responsibility shall cease) at the aforesaid port of Port Said or as near thereunto as she may safely get;' and paragraph 10 of the bill of lading reads as follows: '10: In case where the ultimate destination at which the shipowners may have engaged to deliver the goods is beyond their port of discharging, they act as forwarding agents only from that port; and in all cases the liability of the shipowners on account of all goods is to cease as soon as the goods are free from the tackles of the Ship.'

There are no docks at Port Said, and it is the custom to discharge cargoes by lighters. I think it reasonably follows that the contract contemplated the discharge of the cargo in question by lighters.

The lighter 57 was owned by Cory Bros. & Co., Limited, and operated by them. There was no agreement between Cory Bros. and the Anchor Line concerning the

use of this lighter. The lighterage charge was paid by the consignee and not by the Anchor Line.

Since, therefore, the Anchor Line was not obliged to land the goods, for the custom contemplated delivery to a lighter, there is no escape from the terms of the bill of lading. This frees the shipowner from all responsibility when the cargo is delivered in good order and condition from the ship's tackles. It was so delivered in this case by the ship's tackles, and the libel against the Anchor Line should be dismissed.

Cory Bros. & Co., Limited, on the other hand, seek to avoid responsibility by contending that they were acting, not as a common, but a private, carrier and that, such being the case, the burden rests upon the libellant to prove that the damage was occasioned by their negligence.

The facts cannot warrant any such conclusion. Lighter 57 and her companion lighters 51 and 56 accepted delivery of the goods of all consignees for carriage to shore indiscriminately from the *Castalia*. Lighter 57 indeed carried not only the fifty-five bales of cotton goods in question, but also a varied cargo to other consignees. In these circumstances, Cory Bros. & Co., Limited, were common carriers. The *Wildenfels* (C. C.A.) 161 F. 864.

But whether Cory Bros. & Co., Limited, were private or common carriers does not relieve them from the responsibility of furnishing a seaworthy lighter. The unexplained sinking of the lighter No. 57 raises a presumption of unseaworthiness. *S. C. Loveland Co., Inc. vs. Bethlehem Steel Co.* (C.C.A.) 33 F. (2d) 655; the *Jungshoved* (C.C.A.) 290 F. 733. There was no explanation given by Cory Bros. & Co., Limited, to meet this presumption of unseaworthiness. Accordingly, the libellant may have a decree against Cory Bros. & Co., Limited."

Insurance Class Activities

Recent meetings of the Study Class of the Association of Marine Underwriters of San Francisco have been notable for the timeliness of topics and the general ability of the speakers who addressed the underwriters.

On Dec. 14, Wilfred Page, manager of the Adjusting Department of Geo. E. Billings Company, delivered a scholarly address on the fundamentals of general average. Mr. Page, who is recognized on California Street as an outstanding authority in his chosen profession, outlined the bases upon which general average may be predicated and proceeded to explain the method

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upon which a sacrifice or expenditure is apportioned over the interests involved.

At the same meeting James Scott, surveyor for the Board of Marine Underwriters of San Francisco, discussed ship-board refrigeration, describing the various types of cooling apparatus in use on modern cargo carriers.

At the meeting of Jan. 11, Allan Charles of the admiralty law firm of Lillick, Olson & Graham, favored the class with a talk on "Inherent Vice under Marine Policy." His remarks were restricted to losses under cargo policies involving the well-known principle that, in the absence of specific coverage, the marine underwriter is not liable for deterioration resulting from some defect or quality in the goods insured.

The second speaker of the evening was Barrett Hinds of the San Francisco Bridge Company, whose remarks upon dredging operations on the Pacific Coast were well received by the class. The speaker gave statistics showing the extent

of dredging operations and equipment involved, and outlined the distinctions between the bucket (clam shell) and suction types of dredger.

Webster Street, of Sawyer & Cluff, addressed the class on the evening of January 25, his subject being "Warranty of Seaworthiness in Marine Policies." This topic was in its nature supplementary to the talk made at the previous meeting by Mr. Charles and covered the distinctions in the law of England and the United States with regard to the necessity and extent of the assured warranting the seaworthy condition of the vessel as a prerequisite to the validity of his policy.

The second speaker of the evening was Herbert J. Anderson, secretary of the Pacific Coast Dry Dock Association, who discussed the repair facilities on the Pacific Coast. He defined and described graving docks, floating dry-docks, and marine railways, and showed the class several interesting pictures of various types of vessel hauled out high and dry for repairs.

Freights, Charters, Sales

February 16, 1932

THE following steamers have been fixed with grain to U. K.: Ben Line steamer, North Pacific to 3 ports U. K., lump sum 22 6 on d.w. cargo ton, February, Canadian American Shipping Co.; British steamer Benvenue, British Columbia to London and Middlesbor-

ough, February, Canadian American Shipping Company; British steamer Romanby, Vancouver, B.C., to U. K. Cont., Bordeaux/Hamburg range, 21/-, prompt, Kerr, Gifford & Co.; British steamer Benalder, British Columbia to U. K., March, Canadian American Shipping Co.; British motorship Westmoor, Vancouver, B. C. to U. K. Cont., 23 -, March, Kerr, Gifford & Co.

The following steamers have been fixed with lumber to the Orient: Japanese steamer Okhuni Maru, British Columbia or Puget Sound to Japan, prompt, H. R. MacMillan Export Co.; Japanese steamer Seisho Maru, Puget Sound and British Columbia to Japan, prompt, H. R. MacMillan Export Co.; Japanese steamer Taigen Maru, North Pacific to Japan, February.

The following time charters have been reported: British motorship Cressington Court, 1 trip, delivery China, redelivery China, Japan, via British Columbia, January, Cana-

dian Transport Co.; Norwegian motorship Brand, Pacific Trade, 18 months, option 6 months more, delivery North Pacific, redelivery worldwide, 85 cents U. S., February, Strange & Co.; Danish motorship Lundby, Pacific Trade, 1 trip, delivery North Pacific, redelivery Australia, 1.10, March, J. J. Moore & Co.; Danish motorship Guldborg, 3 to 5 months, Pacific Trade, delivery U. S. Gulf redelivery U. S., North of Hatteras, February, Strange & Co.; Norwegian motorship Tijuca, Pacific Trade, 1 trip, delivery Japan, redelivery U. K./Cont., 75 cents, February, W. L. Comyn & Co.

The concrete tank steamer McKittrick has been sold by Associated Oil Co. to Edward V. Turner.

PAGE BROS., Brokers

Trade Literature

Electric Steam Generators. One of the most recent General Electric Company contributions to industry is the electric steam generator. It is described as simple, new, and unique—and this bulletin describes and illustrates it in full with many photographs and diagrams.

Thrusters. The booklet describes General-Electric Thrusters as applied to power operated machines to produce a straight-line, constant-pressure thrust from an electric-motor drive. It is applicable to two fields—(1) to supply pressure and actuate lever mechanisms, and (2) to replace muscular effort with electric control on foot- or hand-operated machines. Its applications to many varieties of uses are described and illustrated in this booklet.

Port of Detroit, Michigan. Lake Series Report No. 2, prepared by U. S. Army Engineers in cooperation with Shipping Board, is ready for distribution by Government Printing Office, Washington, D. C.; price 45 cents. The usual complete coverage of port activities, in both foreign and domestic trade, are embodied in this book.

San Francisco Harbor. An interesting and handy leaflet has been published by the Board of State Harbor Commissioners, Ferry Building, San Francisco, California, containing in short and lucid paragraphs the important particulars pertaining to the Port.

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Book Reviews

FRESHWATER — A history and narrative of Great Lakes shipping, written and illustrated by George A. Cuthbertson. 314 pages, profusely illustrated in color and in black and white. Bound in buff buckram with blue stampings. Published by The MacMillan Company, New York. Price \$7.50.

Here is a real contribution to the literature of shipping. It is evidently the result of a considerable amount of patient research. Freshwater traces the history of the development of shipping on the American Great Lakes from the times of the earliest French Voyageurs, with their birch bark canoes and bateaux, down to the intensely specialized and mechanized lake carriers of today.

The navigators and operators of these inland seas worked under unique conditions and developed unique adaptations of the ship-builder's skill and rigger's art. The evolution of these special types of ship is traced in Freshwater through the three centuries that have elapsed since the first European discovered the Lakes. During that period "The Great Lakes basin has changed from an unknown wilderness to the most crowded" and in some sense the most important waterway in the world.

The book is full of information presented in a lively, interesting style and made doubly attractive by the illustrations in color from paintings by the author and by the black and white sketches from his facile pen.

MOTOR SHIP REFERENCE BOOK for 1932. 265 pages with numerous illustrations, diagrams, drawings, and tables. Published by The Temple Press, Ltd., London, England. Price 5 shillings, net.

This is the eighth annual volume and contains description and photo-

graphic illustrations and some sectional drawings of every diesel engine now built for marine service. Every motorship of over 2000 tons gross is included in tabulated table giving details of owner, builder, dimensions, etc. There are chapters on auxiliary machinery, fuel and lubricating oil, builders of diesel engines, and other allied subjects.

TRANSPORTING THE A.E.F. IN WESTERN EUROPE, 1917-1919.

By William J. Wilgus. 612 pages, numerous maps, diagrams, and illustrations; bound in green buckram with gold stampings. Published by The Columbia University Press. Price \$12.50.

This account of the railroad and water transportation of the American Expeditionary Forces in Europe, and preachment on the mistakes there made, is written for the American citizen who knows little or nothing about this important aspect of war, and particularly for the younger generation in the army and in the railroad and water transportation fields of civil life, upon whose shoulders some day may rest the responsibility of bearing a similar burden when perhaps the enemy will not be held in check by allies while we are getting ready. To profit by these lessons of the past would seem to be the part of true preparedness.

Several chapters in this book are of intense interest to shipowners; namely, XVII on Ports; XVIII on Cranes; XIX on Floating Equipment; XXIII on Port Operations; XXVII on Ocean Shipping; and XXX Conclusion. In these chapters the operator of ocean mercantile fleets will find a great deal of helpful information and also many potent arguments for the advisability of federal aid in the building of fast cargo vessels as army and navy auxiliaries in times of national emergency.

ed for restaurant, galley, and hospital equipment, is furnished in any thickness required and in any reasonable size. In addition to table tops, it may be used for doors, wainscoting, and interior decoration.

Opens Branch Office.—The I. M. M. has established a passenger traffic office at Portland, Oregon, in American Bank Building, in addition to freight traffic office. John Simmons from Seattle office in charge. Will serve Roosevelt S.S. Corp., I.M.M., Panama-Pacific. A. C. Nielsen handles freight bookings.

R. C. A. Installations.—All ships of Grace Line and Panama Mail Line are being equipped with short and long wave R.C.A. transmitting and receiving equipment under rental agreement.

Westinghouse. — H. C. Thomas has been appointed assistant General Works Manager of Westinghouse Electric & Mfg. Co. He was graduated from Purdue in 1910 and has served in Repair Department, Supply Department, Merchandising Department in New York and Mansfield, and just prior to his recent appointment was Director of Manufacturing Stocks.

Westinghouse.—George H. Bucher has been elected vice-president and general manager by Board of Directors of Westinghouse Electric & Mfg. Co. Joined the firm in 1909 on graduation from Pratt Institute, where he had studied both steam and machine design and electrical engineering. He has held the position of assistant general manager since 1921. Member of A.I.E.E. His headquarters are in New York.

Shipowner's Association. — Paul M. Ripley has been elected chairman of American Steamship Owners' Association, with headquarters at 11 Broadway, New York, succeeding Frank C. Munson. His experience in traffic and shipping is extensive, he being also past-president and member of executive committee of National Industrial League and is chairman of executive committee, Association of Practitioners before the Interstate Commerce Commission.

Trade Notes

Stainless Plymetl. — The metal-faced plywood—Plymetl, bulkhead material for ship work, is now obtainable in Monel and stainless steel faces. The stainless face is glued directly to stiff plywood panel with back of copper-bearing, zinc-coated steel. Its stretcher-lev-

eled surface presents an attractive appearance. Light and strong, it has good resistance to impact. Important characteristic is its sound-deadening quality. It is furnished as a complete top ready for installation.

Stainless Plymetl, extensively us-

Pacific Marine Personals

"NAMES ARE NEWS" ~ BY PAUL FAULKNER

Minister of Fraternity from Pacific Coast Rotary, Apostle of Good will to the South American republics, Business Envoy for his own Pacific - Argentine - Brazil Line - Charles L. Wheeler, vice president and operating manager of McCormick Steamship Company of San Francisco, is now on the first lap of a remarkable itinerary, which, by steamer, rail, and airplane, will take him into every country and nearly every important city and port of South America. This dynamic executive has scheduled sixty-five days to sell the Pacific Coast to the Continent of South America. Such contact cannot fail to benefit the business relations and political reciprocity of the Latin American and the Pacific Coast American.

Newly organized, the Intercoastal Conference, has wisely chosen R. C. Thackara as secretary. Chairman of the former conference, he has had plenty of opportunity to learn first-hand the problems and politics of the intercoastal operators.

When Empress of Japan - Canadian-Pacific liner—returns to Vancouver from her present round voyage in March, Captain Samuel Robinson, C.B.E., veteran commodore of the Canadian Pacific's Pacific fleet will retire after thirty-seven years at sea.

F. A. Clyde of Portland, Oregon, has been appointed Northwest passenger agent for the General Steamship Corporation of San Francisco.

Arthur B. Cahill, president, Suddon & Christenson, chairman of newly organized Pacific Coastwise Lumber Conference, announced rates and declared, "The new tariff will provide uniformity in rates rather than horizontal increases." Rates announced are from all North Pacific Coast ports and North of Powell River for delivery at - San Francisco, Oakland, Los Angeles, \$4; Moss Landing, Santa Cruz, Ventura, Huene, \$5; Monterey, San Luis, Santa Barbara, San



As president of the Luckenbach Steamship Co., Inc., and also at the helm of the Luckenbach Gulf Steamship Co., Inc., Edgar F. Luckenbach is known throughout the merchant shipping world.

Diego, \$4.50. All rates are per 1000 feet. Rates as low as \$3 were quoted during 1931.

Retired marine manager of Babcock & Wilcox, President Emeritus of Webb Institute, and one of the most public spirited and best loved marine engineers of America, Walter M. McFarland has been recently honored through a large portrait



Frequent visitor to the Pacific Coast vice president Lewis Luckenbach of the two famous lines bearing that name.

painted by Ernest L. Ipsen at the behest of the Board of Trustees who have had the portrait hung on the wall of the dining room at the Institute.

Steamer Texan of the American Hawaiian fleet has been awarded the Naval Reserve flag. Officers are: Captain W. C. Brown; Chief Engineer W. Clift; First officer L. A. Hasell; Second officer R. Dorsch; Third officer A. E. Bamforth; Junior Third officer W. E. Brown; First Assistant Engineer, A. P. Stewart; Second Assistant Engineer Patrick Fannon; Third Assistant Wm. Young; Radio Operator R. E. Wheelock; Stewart Fred Prutz.

McGregor Bullock, for several years port engineer at Boston for the United Fruit Company, has been transferred to San Francisco to be port captain in charge of the marine operation department.

Merrill C. Johnson, popular port superintendent at San Francisco for the Grace Line-Panama Mail Services, was guest of honor at a dinner given by Captain Chester W. Gilbert, acting port captain just prior to Johnson's departure for Kearney, New Jersey, where he will supervise the installation of machinery in the new Panama Mail liners at the Federal Shipbuilding & Drydock Company.

American Society of Marine Engineers, at their annual election, chose Henry J. Wolters, port engineer of the Matson Navigation Company, as president; Merrill C. Johnson, port superintendent Panama Mail, as vice-president; Charles L. Grundell of C. C. Moore & Co. as treasurer; Edward R. Brady, as trustee.

E. F. R. De Lanoy, Pacific Coast manager of the Holland America Line recently journeyed to New York and back for a conference with J. Rypperda Wierdsma of Rotterdam, president of the Holland-America Line, who was visiting on the Atlantic Coast.

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	Leave New York	Leave Cristobal	Leave San Francisco	
*Santa Ana.....	Mar. 4	Mar. 5	Mar. 28	
*M.S. Santa Catalina.....	Mar. 8	Mar. 10		
*S. Santa Elisa.....	Mar. 18	Mar. 20	Apr. 11	
*S. Santa Teresa.....	Apr. 1	Apr. 2	Apr. 25	

*Ports of call—Mazatlan, Manzanillo, Acapulco (north), Champerico, San Jose de Guatemala, Acajutla, La Libertad, La Union, Ampala, Corinto, San Juan del Sur, Puntarenas, Balboa, Cristobal, (Buenaventura via Balboa).

*Ports of call Acapulco, San Jose de Guatemala, Acajutla, La Libertad, Corinto, Puntarenas, Costa Rica, Balboa, Cristobal, Cartagena, Puerto Colombia, Havana (East-bound only), and New York.

Through Bills of Lading to east and west coast ports of South America, Cuban outports, Caribbean ports, and to European ports via New York.

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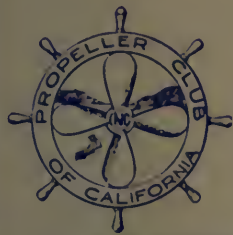


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CAPTAIN A. T. Hunter, recently elected chairman of the Board of Governors of the Propeller Club of California, announces the personnel of the 1932 committees.

Here we publish the roster of these groups heading our various activities, with the chairman of each committee:

Entertainment and Luncheons

H. J. Anderson, chairman
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Increased Membership

Ralph W. Myers, chairman
William C. Empey
Joseph Geary
John C. Rohlfis

Golf Tournaments

C. M. Le Count, chairman
Russell T. Pratt
Vernon Showell
Tom Forster
E. P. Ritchie

Sea Scouts

Captain L. M. Edelman
Captain L. N. Hubbard

Captain Harry Lyon, navigator of the historic plane Southern Cross from the Pacific Coast to Brisbane via Honolulu, Samoa, and Fiji, addressed the March 1 luncheon meeting in the California Room of the San Francisco Commercial Club. Captain Lyon exhibited four reels of regulation film covering this epochal air journey. Charles Kingstord-Smith, control pilot of the Southern Cross, is a brother of our fellow member, R. H. K. Smith of the American-Hawaiian line.

— P C —



Jerry Lalor electrified us as chairman for a record-breaking luncheon meeting. Jerry presented radio stars with radiant voices.

— P C —

Jerome Lalor, with the cooperation of Karl Eber, presented a wonderful array of radio stars for the February 23 luncheon day, and his ability as a master of ceremonies brought out a record attendance—161 Propellers enjoying the superb musicade, by actual count of Secretary Stan Allen.

On February 16 we took the sky-lanes again, this time with Major J. A. Macready, aviation manager of the Shell Oil Company, as speaker, and we enjoyed an educational narration of night flying, its development and pioneering. Major Macready's vivid recital of the emotions of nocturnal parachute jumping gave us the old vertebrate quivers.

— P C —

Dr. J. C. Perry, chief medical director of the United States Public Health Service, explained the functioning of that important organization at the luncheon assembly of February 9, with President Jim Cronin at the ship-bell gavel. Dr. Perry is noted for meritorious service in the Philippines and for the part he played in proper sanitation in Canal Zone.

— P C —

Edward Williams, former marine engineer and now of the marketing department of the Standard Oil Company of New York in North China, addressed the members on February 2nd, his timely remarks on conditions in China, setting another representative attendance mark.

— P C —

V. W. Hoxie is in San Francisco again, having been East for the trials of the new Matson liner Mariposa. Hoxie's now at his new quarters at 450 Mission Street and invites the Propellers for an inspection visit.

— P C —

Plans are now definitely under way for the 1932 Spring Golf Tournament and the committee consisting of Chairman, C. M. ("Dad") Le Count, Russell T. Pratt, Vernon Showell, Tom Forster, and E. P.

(Continued on Page 11)



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Atlantic - Far East

WEEKLY SAILINGS from New York, FORTNIGHTLY from Boston to Honolulu, Yokohama, Kobe, Shanghai, Hongkong, and Manila. FORTNIGHTLY SAILINGS from Manila, Hongkong, Shanghai, Kobe, Yokohama, Honolulu to New York and *Boston.

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Round-the-World

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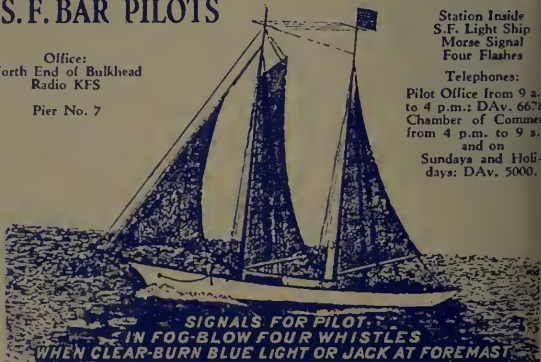


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And Lay Still

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When under Power, a Red one under White; a Flare or Torch is also burned frequently.

Annual election of the Waterfront Employers' Association at San Francisco resulted in the choice of Fred Doelker, manager, Steamship Department, W. R. Grace & Co., as president; Thomas G. Plant, operating manager, American Hawaiian Steamship Co., as first vice-president; and Captain J. G. Ludlow as second vice-president.

Fifty years a ship's butcher, Harry Burroughs, aged 72, and serving in that capacity on the Panama Pacific liner California, died suddenly of heart failure on the night of January 31 and was buried at sea February 2 in the Gulf of Tehautt (sic). He claimed to be the world's oldest working ship's butcher.

Annual dinner of the Bilge Club of Los Angeles Harbor on February 13 brought together 225 leaders of the Southern California shipping industry. Harry J. Summers was in charge, assisted by H. E. Pickering, L. S. Anderson, E. A. Mills, H. A. Keeler, A. O. Pegg, W. P. Tanner, E. R. Brucker, S. A. Kennedy, and Robert R. Snodgrass. An excellent dinner, a fine program, and a true seagoing atmosphere were provided. No speeches were allowed.

At the annual election of the Steamship Operators' Association of Portland, Fred N. Mills, district manager of American-Hawaiian, was chosen president; A. R. Frye, general freight agent, Powell Shipping Company, became vice-president; and Howard Shaver of the Shaver Transportation Company was inducted as secretary-treasurer. From 1924 to 1927 Mr. Mills was in San Francisco as general claims agent, American-Hawaiian. Since May 1, 1927, he has been district manager at Portland.

Commander H. H. Norton, formerly associated with the fuel oil research department at League Island Navy Yard, Philadelphia, and later with the Bureau of Operations of the United States Navy at Washington, D. C., is now commander of the navy river gunboat, Sacramento, and recently sailed from San Francisco for Asiatic service. Commander Norton is well known in San Francisco where he made a host of friends as senior engineer officer on the U.S.S. Maryland.

Anxious to preserve shipbuilding on the Pacific Coast, seven cham-

bers of commerce have combined to form a joint committee charged with the duty of working for the passage of the Carter Bill through the present session of Congress. This committee is composed of: J. Scott Rider (chairman), Sherman K. Burke, and Herbert J. Anderson of San Francisco; Franklin B. Cole and Allan Steele of Los Angeles; Charles P. Howard and O. H. Fischer of Oakland; O. C. Roebr and Willis K. Clark of Portland; William J. Cook and U. D. Moore of Seattle; and S. J. Maxwell and Henry Foss of Tacoma.

This is a strong and very representative committee that will be able to line up a solid Pacific Coast backing for this very desirable legislative assistance for Pacific Coast shipbuilders.



Authority on intercoastal passenger and freight traffic trade and trends — W. H. Hoskier, Pacific Coast manager of the International Mercantile Marine Company, and also in charge of West Coast business of the Roosevelt Steamship Company, general agent for the United States Lines and American Merchant Lines. Hoskier is 39 years young, was born in Orange, New Jersey, joined the I.M.M. in 1920 and his home now is Hillsboro, suburb of San Francisco.

American Marine Standards Committee of the Division of Simplified Practice of the United States Department of Commerce has, during its decade of work, established over 100 standards in ship construction, ship fittings, and operating practice. This committee has included the most prominent shipbuilders, naval architects, marine engineers, and ship operating executives in

America. Officers of the executive board elected in 1932 are: H. G. Smith, president, National Council of American Shipbuilders, chairman; Captain R. D. Gadswood, vice chairman; and A. V. Bonillon, executive secretary. Board members elected are: George H. Bates, vice-president, United Dry Dock, Inc.; H. H. Brown, editor, Marine Engineering and Shipping Age; Major General Lytle Brown, Chief of Engineers, U. S. Army; Homer L. Ferguson, president, Newport News Shipbuilding & Dry Dock Company.

Commissioner Joseph J. Tynan, of the California Board of State Harbor Commissioners, has accepted the invitation of his old friend James A. Farrell, chairman, National Foreign Trade Council, to attend the National Foreign Trade Conference at Honolulu, May 4 to 6.

OBITUARY

Alfred A. Howitz, chief engineer, Sun Shipbuilding & Dry Dock Co., Chester, Pennsylvania, died January 17 after a long illness. Graduated from Lehigh in 1894, he joined the Newport News Shipbuilding & Dry Dock Company. After fourteen years, he joined the New York Shipbuilding Company as assistant chief engineer and after eight years in that position became chief engineer of the Sun shipyard on its organization in 1916. He was a member of the Society of Naval Architects and Marine Engineers and of the American Society of Naval Engineers.

Alfred P. Nott, superintendent of terminals for the Los Angeles Steamship Company, died February 13 in Wilmington, California. A Canadian by birth, Mr. Nott has been connected with the transportation industry since his youth. He has been on the Pacific Coast for thirty years.

Charles F. Davis, chief engineer of the steamship Prince George of the Canadian National Steamship Lines, died suddenly at Prince Rupert Hospital February 2. Aged 51, he had served with the Canadian National Steamships for twenty-one years.

About the middle of January, Walter Kaestner, popular customs inspector at San Pedro, died suddenly from a peculiar "pariet fever" contracted in the line of duty.

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MAKERS OF HEAVY DUTY MARINE PAINTS FOR OVER 50 YEARS

Larry Scandon releases this imposing scene taken aboard the Panama Mail liner Santa Ana. To starboard is Charlie Taulund, purser, and a'port is James G. Sager, chief steward of the Santa Ana. Passengers to and from the Americas learn travel comfort and become cruise conscious with this capable and veteran pair in Panama Mail service.



George Koetter, New York operating manager of the Hamburg-American Line, aged 69, died on February 20, after a succession of strokes. Koetter entered the Hamburg-American service as third engineer on the steamship Columbia in 1889, so that in 1929 he celebrated the fortieth anniversary of his Hapag connection.

On February 18, with simple but very impressive ceremony, the ashes of "Bob" Roberts, were scattered on San Francisco Bay from the deck of the Red Stack tug Sea Lion, donated for the occasion by "Tom" Crowley. Many outstanding personalities who have known and loved this genial soul were gathered to pay their last respects. Roberts for many years covered the waterfront for the San Francisco Chronicle.

Captain Milton E. Reed, U.S.N., retired, died recently in the Southern Pacific Hospital at San Francisco. Entering the Navy in 1886 he was promoted from the ranks and won a captaincy before he was retired in 1925. For a time just after the World War, Captain Reed was industrial manager of Mare Island Navy Yard and later was with the Naval Board of Inspection and Survey at Washington, D. C. After his retirement he served as Supervisor of Service for the Southern Pacific Company at Vallejo.

PROPELLER CLUB NEWS (Continued)

Ritchie expects to have the big affair scheduled either for the last of March or early in April. As this advance news goes to press, the committee advises that full details will go out to the members by mail. Plenty of Propellers are overhauling their gear and making surveys of the ares and angulations. For instance, C. C. Mallory won \$1.92 from Frank Fox at Lakeside last Sunday, in a two-bits a hole challenge round. The odd cents, says Frank, came when "C. C." was penalized for using a short tee in the luscious lake course rough. Witnessing this strict adherence to royal and ancient rules were Jim Young chiseling Pete Jurs to the extent of three beans. Our Operative No. PC further reports that Jim jammed down a thirty foot putt which didn't do Pete any good. Bill Edwards and George Yager and Bill Empey were working out the wintry kinks, too, but it seems they were playing for the true fun of the sport. All hands are glad to know that Charlie Duncanson is back on the job again, so Golf Chairman "Dad" Le Count may as well set aside a prize for him right now.

— P C —

A bay water saga comes of the trial trip of the smart cruiser "Tommy Dee," designed for comfort and cure-chasing. The master and own-

er is Tommy Dee, widely known tycoon in refractories and he took out an experienced coterie of salt water experts to test the cruiser's ability to attract fish in countless schools.

The bottom of the trim craft has minnows painted thereon, of aluminum hue, and Frank Evers, principal surveyor of the American Bureau of Shipping, trolling from a cozy wicker chair within the cabin, line out of port hole, landed the mightiest fish of the day—only he yanked off the mammoth critter's head in endeavoring to pull it through the port hole!

With appropriate ceremonies Tommy Dee appointed Captain Stanley Allen as master of this latest addition to the West Coast pleasure fleet.

Still all went well with the maiden run party. Jim Cronin, prexy of the Propeller Club of the Golden State, Kenneth Ingraham, H. J. Anderson, and Secretary Stan Allen didn't have to miss a meal because of Frank Ever's untimely finny monster loss, as Hugo Paladini was on the job, concocting his famous palate appeasing dishes.

Skipper Dee is having his command's ports made larger—assuring safe dockage of future catches, and this burst of shipyard work is encouraging news to the western shipbuilding industry.

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THE S. S. MARIPOSA IS DRIVEN BY TWIN SCREWS OF PARSONS' MANGANESE BRONZE



An Unforgettable Sight

NOT a few of the sailing ship masters of the past generation have been very handy with brush and pencil and have preserved for us their ideas of the appearance of their favorite ships at sea. For the above sketch, showing the ships *Ross Shire* and *Kentmere*, we are indebted to the pencil of Captain Andrew Baxter, who was in command of the *Ross Shire*.

It so happened on this occasion that the since famous marine artist Charles Robert Patterson was among the crew of the *Kentmere*, and has given us his reminiscences of the voyage in an interview published some time back in the *Boston Evening Transcript*.

"One of the ships with which Mr. Patterson was familiar was the *Ross Shire*, a British steel ship. Captain Andrew Baxter was her captain at one time, and had the proud distinction of rounding Cape Horn as master of big ships twenty times. Mr. Patterson remembers the *Ross Shire* particularly well because of an incident that happened when he was on the *Kentmere* many years ago.

The *Ross Shire* was bound on the same trip, but left Portland three weeks after the *Kentmere*. When the *Kentmere* was off the Azores, or Western Islands as seamen call them, she struck a heavy westerly gale. It was blowing hard and there was such a sea running that, though it was a fair wind, the crew came aft and asked the captain to heave to.

The next morning it was still blowing hard, with a clear blue sky, and at 5:30 they put the ship away before the wind again and started to make sail. Pretty soon a big vessel was sighted off the weather quarter, coming along, a noble sight in the morning sun with every stitch of canvas set. She was a four-masted bark, square-rigged, and, to give some idea of her size, the loftiest and therefore the shortest spar on her, the royal yard, was fifty-two feet long. She went by the *Kentmere* as if we were anchored.

When the *Kentmere* reached Hamburg some days later she moored just astern of the *Ross Shire*, with her bowsprit poked over *Ross Shire*'s stern, but it was not until many years later that Mr. Patterson met Captain Baxter, who recalled that morning to him and remembered perfectly passing the *Kentmere*, but simply said that he wanted to get to Hamburg under one hundred days, and that he was driving her. Captain Baxter was noted as a sail-carrier, and the *Ross Shire* made that passage to Hamburg in ninety-six days.

UNCLE SAM KEEPS HIS WEATHER EYE OPEN!



The government tug "Manitowoc," used by the Corps of Engineers in inspection service. A Model D Kohler Electric Plant furnishes current for general lighting.

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*Other governmental users include the U. S. Navy and Marine Corps; the Departments of Treasury, Coast Guard; Justice, including law prisons and penitentiaries; Post Office, and civil service; Interior, Bureau of Indian Affairs, including public service; Agriculture, forest service; Commerce, Bureau of Lighthouses.



Kohler Electric Plants generate standard electric current at 110 or 220 volts, 1. c., or D. C. Gasoline or diesel fuel. There are marine units ranging all the way from 1500 watts to the 25 K. V. I. Model in service on several new mail liners. Model D, 1500 watts, shown in cut.

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F-M engineers to present the facts about Fairbanks-Morse two-cycle, airless injection Diesel engines as they apply to your marine power problems. Or, if you prefer, interesting literature will be mailed upon request.

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Pacific Marine Review

APRIL, 1932

Operating Cost Reduction The Aim of Every Port Engineer



Picture by courtesy of Matson Navigation Co.



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Pacific Coast Representative,
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building, San Francisco,
will be pleased to fur-
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this metal, which is
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San Pedro Works

LEFT: S. S. City of Honolulu in the 15,000-ton Floating Drydock, San Pedro Works. This yard is convenient to all the shipping that touches Los Angeles Harbor.



Hunter's Point Works

LEFT: A fair idea of the immensity of the 1020-foot Graving Dock at Hunter's Point Works, San Francisco Bay, can be obtained from this view of the U. S. Airplane Carrier Lexington in the dock. This dock is one of the largest Graving Docks in the world.



Potrero Works

BELOW: Airplane view of Potrero Works, the only combination Ship yard and Drydock Plant in the City of San Francisco.

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The National Magazine of Shipping

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APRIL, 1932

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Blue Section	

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Official Organ
Shipowners' Association
of the Pacific Coast

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NEWPORT NEWS

Delivers New Liner For The Great White Fleet

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PHOTO BY SWADLEY

**A striking photographic study of Matson Liner Mariposa
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Pacific Marine Review

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APRIL, 1932

NUMBER 4

Editorial Comment » » »



The United States in Foreign Trade

MANY of our keenest luncheon and dinner speakers are seizing the opportunity offered by the present depression to bring out panaceas for the cure of America (meaning the United States). Some of these worthies advise us Americans to get into foreign trade—to increase our foreign investments—to cut down our tariff barriers. Others, with just as much apparent sincerity, advise that we adopt a policy of isolation and become economically independent of the rest of the world. At a recent meeting of what has often been called the most intelligent luncheon audience in America, a well known American educator asks:

"Will world investment and foreign trade be America's way out?" and answers himself thus:

"Phoenicia tried it, England has tried it; and though each was successful for a long period, disaster came in the end.

"I see more hope for the concentration of American thought, skill, and ingenuity in our own country, to develop our own resources."

This sort of talk is going on all over the United States; and the men who are doing it either are deliberately trying propaganda to achieve some ulterior purpose or have given no thought or study to our present position in world trade. The years 1930 and 1931 were quite subnormal in world trade, and yet in the fiscal year ending June 30, 1931, the total volume of overseas foreign trade into and out of ports of the United States was over 86,000,000 tons, or 1480 pounds per year for

every one of our 130,000,000 population. There is, in addition to this huge volume of traffic, the foreign trade over our land borders north and south. So we may take it for granted that the share in foreign trade of each of us—men, women, and children all counted—is in a normal year more than a ton of miscellaneous merchandise.

The value of this huge volume of goods is, in a normal year, approximately nine billions of dollars, or approximately seventy dollars for each man, woman, and child in the country.

Now, when we have taken into consideration the volume and value of this foreign trade of ours and added to that the staggering total of our present investments in foreign securities, promotion of foreign trade, and so forth, we have just begun to scratch the surface in our investigation of the effects of foreign trade on our home industries and on our own personal habits and manner of living.

How long would the majority of us be able to exist without canned food? Without world trade, there could be no tin cans.

Could the average family among us now exist without incandescent electric lamps, without telephones, without autos? Without world trade, all of these articles would be almost impossible economically for the average family.

We could go on filling many pages with instances of our dependence on world trade. Every thinking reader will be able to supply many from his own experience.

It is true that these United States as we found them were probably better fitted for the existence of a free people, independent of the world, than was any other portion of the globe. But we have, during the past seventy-five years, built up an industrial mechanized civilization which is probably more dependent on world trade than any of the civilizations of the older world. America's mechanized industry and the "American standard of living" are interdependent and both are dependent on America's whole-hearted participation in World Trade.

It is for these reasons that far sighted statesmen encourage the building up of our merchant marine, the expansion of the banking system to take care of foreign credits, the development of our seaports to handle commerce economically, the conservation of our shipyards to meet the future needs of shipping, and the expansion of the foreign service under the Department of Commerce.

Every citizen of the United States should be thoughtful on the subject of World Trade and tariff for every one of us has a very vital "stake" therein.

Financing Sea Trips

ON March 1, 1932, the Cunard Steamship Company, Ltd., announced the application of a deferred payment plan to the sale of steamship tickets on the North Atlantic. Salient features of the plan are: An exclusive agreement for financing arranged between Cunard and the Morris Plan, whereby the local agent assists the prospective customer in arranging a loan at an interest charge of 6 per cent. per annum; 25 per cent. down payment in cash; a small payment per month after the trip has been completed and suitable life insurance to protect the principal.

This plan is open to the public generally but is primarily designed for "school teachers, educators in general, professional people, and others whose usefulness and ability will be enhanced by foreign travel but who do not find it convenient to pay the full cost of passage before sailing." Incidentally, a fairly steady income and long vacation period would seem to be two essential elements.

Cunard claims, "This innovation is hailed as the panacea for ills from which the shipping industry has been suffering for the past two years" and that "this is the first time a large scale installment financing project has been applied to an intangible."

Unless we are grossly misinformed, the large travel agencies have sold tours on deferred payment plans for some years past and particularly to school teachers. As examples of applying "large scale installment financing to intangibles," we would respectfully submit certain American common stocks in 1929, certain foreign bonds, or the late World War.

No American school teacher needs to travel on foreign flag vessels in order to get his or her passage paid for on a deferred plan. American banks will finance such trips through their travel departments on terms that are just as advantageous as those offered by the Cunard-Morris scheme.

Assessing Tolls at Panama

AMERICAN shipowners are opposing the proposal to change the dual system of measurement under which Panama Canal Tolls are now assessed for one based solely on Panama Canal Measurement Rules unless such changes decrease the tolls collected.

The following excerpt and table from "Panama Canal Record" show what the effect of the proposed change would have been on the tolls collected in January and fully justifies the stand taken by the shipowning associations.

"At present tolls are collected at rates of \$1.20 per net ton for laden vessels and \$0.72 per ton for vessels in ballast, computed on the basis of the Panama Canal rules of measurement, with the provision that tolls shall not exceed \$1.25 per ton, nor be less than \$0.75 per ton as determined in accordance with the United States rules for measurement of net registered tonnage.

Taking the traffic through the Canal for the month of January, 1932, the tabulation herewith shows a comparison of tolls actually collected under the present method of assessing tolls with the tolls that would have been collected on the basis of the Panama Canal rules

Nationality.	Tolls actually collected under present dual system.	Tolls that would have been collected under proposed rates of \$1 laden and \$0.60 ballast on basis of Panama Canal net tonnage.	Difference.		Pro rata of tolls actually collected per Panama Canal net ton.	
			Increase.	Decrease.	Laden.	Ballast.
Belgian.....	\$17,831.68	\$19,476.40	.....	\$1,355.28	\$1.042	\$0.720
British.....	450,858.37	482,020.00	\$31,161.63	.....	899	720
Danish.....	19,692.50	22,296.00	2,603.50	.....	883	.....
Denmark.....	8,742.50	8,188.00	.....	554.50	1.068	.....
Dutch.....	35,968.87	45,789.00	6,822.73	.....	822	720
French.....	40,527.50	48,014.50	7,217.00	.....	849	.....
German.....	88,297.10	103,415.20	15,118.10	.....	837	721
Greek.....	2,788.75	3,426.00	640.25	.....	813	.....
Italian.....	46,986.25	55,091.50	6,414.84	.....	816	720
Japanese.....	78,238.35	75,390.00	.....	2,839.35	1.039	.....
Norwegian.....	114,561.02	125,221.40	10,660.38	.....	892	714
Swedish.....	51,458.28	53,284.00	1,727.72	.....	860	708
United States.....	807,362.10	873,024.80	65,662.70	.....	911	720
Yugoslav.....	3,757.50	5,117.00	1,359.50	.....	734	.....
Total.....	1,770,250.68	1,914,865.90	144,389.35	4,773.13	899	716
Net increase for all traffic.....			144,615.22			

* Includes \$2,325 collected on naval vessel at 50c per displacement ton.
* Includes \$33,587.50 collected on naval vessel at 50c per displacement ton.

The increase on vessels of United States registry would have been distributed with respect to channels of trade in which the vessels were engaged as follows:

United States intercoastal trade.....	\$32,261.71
United States foreign trade.....	34,044.19
United States—Canal Zone trade.....	* 643.20
Total.....	65,663.70

* Indicates decrease.

of measurement at the proposed rates of \$1 laden and \$0.60 ballast with no added charges for deck loads."

Another Handicap

A PROPOSAL dangerous to the welfare of American shipping enterprises is contained in the passport fee increase bill which passed the House of Representatives February 24 and has been sent to the Senate for its approval. Under the terms of this bill, the present passport fees would be nearly doubled, although the cost of issuing the passports has not increased one cent. The object, therefore, is an additional tax on the travelling public.

The present law requires a \$6 fee for the original passport, which is good for two years, and allows two renewals of two years each with a fee of \$2 for each renewal. The bill passed by the House would increase the original fee to \$10 and allow but one two-year renewal, for which a fee of \$5 would be charged.

Few members of Congress seem to realize that no longer is overseas travel merely a luxury of the well-to-do. The bulk of the travel last year was by people of modest means. Much more than half the tickets to Europe were for accommodations averaging \$100 or less. On all such tickets there is already a revenue tax of \$5 which, added to the \$6 passport fee, amounts to a total tax of 11 per cent. The proposed \$4 additional only serves to increase the burden and places one more obstacle in the way of securing patronage for the American merchant marine.

The House Foreign Affairs Committee, wherein this bill originated, has taken the position that the increase proposed will enable the State Department to offset the entire cost of maintaining its foreign service through the collection of fees. This, of course, amounts to class taxation. The foreign service of the United States is no more maintained for the sole benefit of the American traveler than it is for the American farmer, the American banker, or the American manufacturer. It is maintained for the welfare of the whole country and as such should be supported by the whole country.

Motorship North Star

*New Seattle-Built Wooden Vessel of Unique
Design for Alaska Service*

By Chas. F. A. Mann

WHEN the new Seattle-built motorship North Star sails for Alaska sometime this month, another somewhat unique craft will have taken its place among the extensive fleet of patrol and service ships operated by the United States Government in enforcing the various territorial laws and in caring for the isolated native tribes scattered over 5000 miles of Alaska coastline.

The North Star was completed in about eight months' time at a cost of around \$400,000. She carries the Department of Interior Flag in the service of the Bureau of Indian Affairs. The North Star replaces the historic schooner Boxer. (It is worthy of note that with the passing of the cutter Bear and the schooner Boxer, the United States Government has turned to diesel power 100 per cent. for its larger ships in the Alaska services.)

The motorship North Star has the following principal characteristics:

Length over-all	225'0"
Length between perp.	210'0"
Beam molded	41'0"
Beam over guards	42'0"
Depth molded	21'6"
Load draft	18'6"
Horsepower	1500
Cargo capacity, tons	1250

W. C. Nickum, designer of
motorship North Star.



The North Star was designed by W. C. Nickum, naval architect of Seattle, and staff, whose long experience with nearly one hundred important steel and wooden ocean-going craft of many types has enabled them to produce a vessel of unusual strength and capacity at low over-all cost. Mr. Nickum was construction manager at the big Todd plant at Tacoma during the building of the United States cruisers Omaha, Milwaukee, and Cincinnati and the Southern Pacific Steamship Lines steamer Bienville, and has many government ships to his credit.

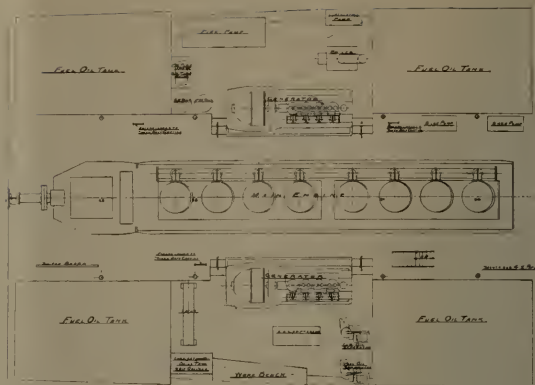
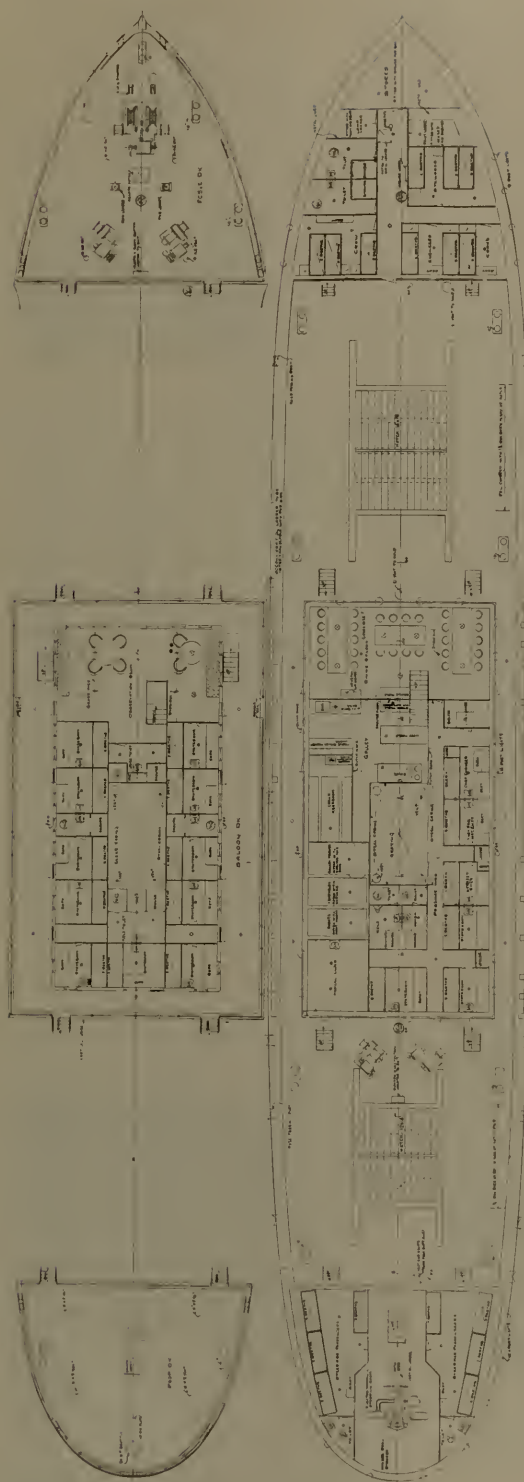
North Star is a heavy-duty, three-island type wooden ship, with unusually heavy framing and sheathing to withstand ice pressure and a cut-away bow designed to ride over ice and smash it with the ship's weight. A unique departure in wood ship design is noted in the cruiser type stern on this vessel, one of the very few so designed.

Framing is made up of double 12x22-inch flitches, spaced 30 inches on centers, thus giving but 6 inches of space between frames. She has: 8½-inch bilge timbers; 5-inch floor timbers below and 6-inch floor timbers above tween deck level; and a heavy inside sheathing, all of clear Douglas fir. The outside planking is



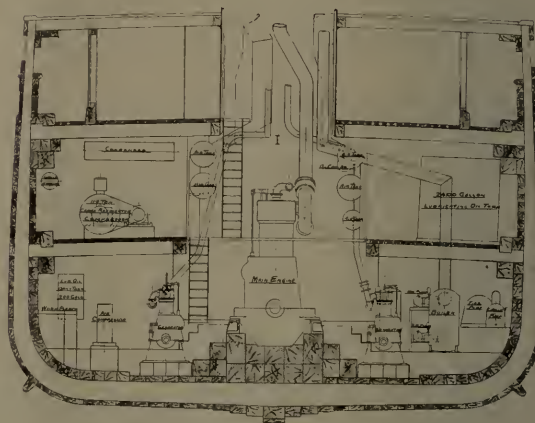
Two interesting views of the motorship North Star taken at the time of her launching. The illustration above shows the bow cut away for ice navigation. At the right is shown the neatly molded cruiser type stern, a very unusual feature in wood construction.





PLANS OF NORTH STAR

At left, general arrangement plans of the main and superstructure deck showing the accommodation arrangement for passengers and crew, the arrangement of deck machinery and steering gear, and the generous provision of hatchways. Above, arrangement of machinery and tanks in the engine room space. Below, section of vessel in way of engine room space.



4½-inch clear fir with 1½-inch extra ironback sheathing above and below the water line. Keel timber is a piece 12x20 inches with two main keelsons 18x20 inches; 4 sister keelsons 18x20 inches; and 2 outer sister side-keelsons 18x20 inches. She is very heavily cross-braced at deck levels.

Her lay-out permits very large cargo holds fore and aft of the center island. Refrigerated cargo is carried aft, and alongside the engine room tween decks and the cargo space forward is one large hold. She is divided into five water-tight compartments by four heavy wooden bulkheads which are of very heavy construction. Approximately 1,100,000 feet of lumber and over 400,000 pounds of iron and steel were used in the construction of this hull.

Machinery

The main engine is of the latest type McIntosh & Sey-

mour, fully reversible, mechanical injection, 4-cycle, trunk piston marine diesel engine, with ten cylinders and developing 1500 horsepower at about 220 revolutions per minute. Bore and stroke are 20 and 24 inches, respectively. This engine was supplied by E. V. Winter, Pacific Coast Representative of McIntosh & Seymour. The contract calls for a fuel consumption of not over 0.45 pound of fuel per horsepower hour under normal operating conditions. The ship framing in way of engine room floors is built in solidly with no space between frames, and the engine is carried on special cast iron longitudinal girders bedded solidly on long clear Douglas fir timbers of great size and strength.

This engine is directly connected to the propeller shaft with the thrust bearing installed at the after end of the engine. There are two intermediate bearings and two intermediate lengths of shaft between the thrust bearing and the stern tube. A Coolidge 3-bladed bronze propeller is fitted, 9 feet $1\frac{1}{2}$ inches diameter, and 7 feet pitch. Designed speed is $12\frac{1}{2}$ to 13 knots on trial running light or 11 knots sea speed fully loaded.

North Star will carry 1800 barrels of fuel oil in eight tanks, enough for about 48 days or for a cruising radius of 12,500 miles. Two De Laval oil purifiers are installed, one for fuel oil, the other for lubricating oil.

For auxiliary power and lighting, there are two generating sets, each consisting of a 4-cylinder, 4-cycle, Atlas Imperial 110-horsepower diesel engine direct-connected to a 75-kilowatt, 220 volt, direct-current General Electric generator.

Pumping equipment consists of the following:

- 1 Centrifugal 200 G.P.M., 230-ft. head 1750 R.P.M. pump, driven by 24-H.P. motor;
- 2 Centrifugal bilge pumps, 450 G.P.M. at 20-ft. head, each driven by a $7\frac{1}{2}$ -H.P. motor;
- 1 Centrifugal circulating water pump, 500 G.P.M., driven by a 10 H.P. motor;
- 1 Lubricating oil 200 G.P.M. Viking rotary pressure pump, 70 lbs. pressure, driven by a 15-horsepower motor;
- 1 Viking rotary sump pump;
- 1 Viking oil transfer pump.

All of these pumps were supplied through the Seattle office of the De Laval Pacific Company and were installed by the Markey Machinery Company of Seattle. The motors are all General-Electric.

An Ingersoll-Rand vertical 2-stage air compressor, capable of delivering 40 cubic feet per minute at 350 pounds pressure and driven by a 10-horsepower General-Electric motor, takes care of starting and maneuvering air. Another of approximately one-half that capacity is installed for emergencies.

Two cold storage compartments are served by the 10-ton York ammonia system unit. One chamber, a quick-freezing room, is very heavily insulated with cork and is cooled by 3500 feet of wrought-iron brine circulating pipe. A larger chamber, served by 1400 feet of wrought-iron brine circulating pipe, is insulated to maintain a temperature of 30 degrees. This room is especially designed for the transport of frozen reindeer meat and will take care of many hundreds of carcasses. A special system is installed to take care of the ship's stores and a cool room. Each of these takes 65 feet of brine piping and both are served by one $\frac{3}{4}$ -ton capacity York unit driven by a $1\frac{1}{2}$ -horsepower motor.

For circulating fresh and salt water there are two independent automatic systems, each having large reserve capacity tanks and each operated by a pump driven

by a $\frac{1}{2}$ -horsepower motor. This equipment was supplied by A. H. Cox and Company of Seattle.

Deck machinery and steering gear were supplied by Allan Cunningham of Seattle and are all driven by General-Electric motors. This equipment includes: 4 cargo winches, each driven by a 15-horsepower motor; a docking capstan, driven by a 10-horsepower motor; an anchor windlass, driven by a 25-horsepower motor; and an electro-hydraulic steering gear, driven by a 10-horsepower motor.

Navigation and Safety

North Star has to be handled with ease and promptness in many difficult channels and on one of the foggiest coasts in the world. For maneuvering and navigation she is equipped with all of the devices that long experience on the Alaska coast has proved necessary. She has an Oertz patent stream-line rudder for steering efficiency; a Cunningham helm angle indicator; a Cunningham electric telemotor; a latest type Kolster radio compass; a Cunningham pneumatic whistle. She carries five anchors, ranging in weight from 504 to 4000 pounds and ample provision of anchor chain cable furnished by the Seattle Chain Company.

For safety, North Star carries four steel lifeboats, 20 feet by 6 feet 9 inches by 2 feet 7 inches, built by the Tregoning Boat Works of Seattle, and for service she carries a tender 27 feet by 8 feet by 3 feet, driven by a 3-cylinder, 30-horsepower Regal gasoline engine, and a lighter 30 feet by 14 feet by 3 feet 4 inches.

The fire hazard is minimized by a Lux carbon dioxide fire extinguishing installation covering the engine room and hold and by a fire detection and alarm system covering all strategic points with indicator in the pilot house.

A 500-watt Mackay Radio wireless transmitting and receiving set keeps the ship in touch with shore stations at all times.

Passenger Accommodations

As will be noted from the plans published herewith, the bedrooms and public rooms for passengers are grouped on A Deck, with the exception of the dining room, which, with the galley, is on B Deck. There are 14 large bedrooms, each arranged for two passengers. Spring beds, hot and cold running water, heavily carpeted floors, good ventilation, steam heat, all combine to make these rooms very comfortable. Public rooms include a lounge and an observation room, comfortably furnished and equipped with facilities for reading, writing, card games, and other pleasant ways of passing away time on a long sea voyage.

Officers' quarters are unusually spacious and comfortable for a ship of this size. Provision is made for berthing a crew of 28 in the forecabin and for housing 20 steerage passengers in the poop.

The North Star was built at the Ballard yard of the Berg Shipbuilding Company, under the personal supervision of Captain S.T.L. Whitlam, who will be her skipper when she sails for the North; J. R. Ummel, manager of the Seattle district office of the Department of the Interior; and H. C. Hanson, acting consultant for the builder. Mr. Hanson is a well known Northwest designer of many successful Alaska commercial and fishing craft. Machinery installation was supervised by Herman Sanwick, who will be her chief engineer. Hanson and Rowland, Inc., of Tacoma handled the financing of the ship and all bonds and insurance for the builders.

European Gateways for Pacific Coast Exports

*A Series of Sketches Covering Continental European Ports
and the Pacific Coast Services Based on Those Ports*

I. Bremen and the North German Lloyd



IN an afternoon in the early summer some time in the Sixth Century, a boatload of Wend fisher folk, seeking refuge from the pirates of the North Sea, rowed up the Weser River. There, on a point, the helmsman saw a wild hen sitting on a nest of eggs. Taking this for an omen of security, he steered the boat inshore and there was founded the fishing village of Bremen. In 787 A.D. this village was chosen by the great Charlemagne as a suitable site on which to build an outpost against Saxon raids. The important career of the city and port began in A.D. 933, when Adaldag was appointed archbishop and later Count of Bremen. Having to be absent from the city for long periods on business of church and empire, Adaldag ruled through a deputy and through a Senate elected by the guilds. Through his influence he obtained for Bremen: The right to hold an annual market fair; the building of a city wall; great improvements of the port; advantageous commercial treaties with her neighbors. In short, Adaldag set Bremen on her way to commercial success.

The Senate of Bremen, thus started, kept the upbuilding of Bremen's commerce as practically its sole object through all the troublesome times of the breaking up of the empire and the religious wars of the Reformation. Thus the

Senate, in 1195, took over from count and archbishop the regulation of commerce and ships' dues; in 1221 forced the count to take down the chain he had set across the river to detain ships; in 1228 forced the count to stop taxing goods transiting the city in bond; in 1252 took over the right to formulate all commercial treaties; in 1250 joined the Hanseatic League.

At the beginning of the Nineteenth Century the president of the Senate, Burgomaster Schmidt, seeing Bremen about to be cut off from the sea due to the political upheavals at the close of Napoleon's career, which threw both banks of the Weser River north of Bremen to hereditary enemies of that city, made a secret bargain with the Duke of Brunswick (one of these enemies), whereby the city came into possession of a tract of land on the estuary of the Weser at a very suitable location for a deep seaport. Here has been built up during the past one hundred years the City



Above, the old Port of Bremen on the Weser from an ancient print, depicting the city's river front as of the Fifteenth Century.

At the left, one of the busy cargo ship bases in the modern Port of Bremen. A striking illustration of what can be accomplished by single-minded citizen's fighting against great odds.



North German Lloyd steamer Witell loading California products at the California State Produce Terminal, San Francisco.

and Port of Bremerhaven with facilities suitable for the largest ships afloat. This is now the home port of the great North German Lloyd liners Bremen and Europa.

Today Bremen claims first place among continental European ports in cotton imports, and is well up towards the top in imports of wool, tobacco, coffee, grain, rice, fruit, and lumber. Her exports are chiefly high class industrial products, metal ware, and machinery. Both at Bremen and at Bremerhaven the equipment and systems developed to handle these commodities with speed, safety, and economy are unsurpassed among world ports. Bremen is fifty miles up the Weser from Bremerhaven, but the river channel has been so developed that ocean steamers of today are able to navigate up to Bremen easily at one tide, while Bremerhaven is accessible at any stage of the tide to the largest express liners afloat.

The administration of the port, the upkeep and construction of docks, is under the Deputation for Harbors and Railways of the State of Bremen. The operation of the port is under joint private and state control. The port boasts: 278 electric quay cranes of 1 to 10 tons

capacity, many of them spanning four waterside tracks; 27 miles of quays; 180 miles of railway trackage on the quays; 437,000 square yards of floor space in quay sheds; 479,000 square yards of floor space in warehouses; 21 warehouse cranes; 120 warehouse elevators and winches; a grain transshipping plant with a capacity to unload vessels at 700 tons an hour; a potash depot that loads vessels from river barges at the rate of 5000 tons a day.

The North German Lloyd Steamship Company, now celebrating its seventy-fifth year in business, is the chief link between the Pacific Coast and Bremen, maintaining a regular, dependable service between Puget Sound, Columbia River, and California ports and Antwerp, Bremen, Hamburg. Principal commodities eastbound are cedar logs, Douglas fir, lumber products, fresh and dried apples, citrus fruits, dried prunes, canned fruits, canned salmon, and many other food products. Westbound come manufactured articles. Vessels on this line carry refrigerated cargo and accommodate a limited number of first-class passengers.

North German Lloyd, established February 20, 1857, has in its seventy-five years carried 12,263,112 passengers; seen its own fleet grow from a combined sail and steam vessel of about 5000 tons gross to an aggregate tonnage of 959,317; captured the Blue Ribbon of the North Atlantic in 1898 and held it until 1907; recaptured it in 1929 and still holds it. In 1914 this company had 982,000 gross tons of shipping engaged in worldwide services. The war reduced this total to 57,000 tons with no single vessel over 1000 tons. Today, therefore, the North German Lloyd is in a very enviable position with a fleet that is, on the average, more nearly 100 per cent. modern than any other of the world's large merchant fleets.

This fleet, radiating from Bremen as a home base, carries the key and anchor symbol into the ports of five continents on a world-wide network of trade routes. At the top of the fleet are the two transatlantic superliners Europa and Bremen, two fastest merchant ships afloat, and throughout the fleet on bridge and in engine room the aim and spirit of the organization are symbolized by the North German Lloyd slogan, "Nothing Succeeds Like Express."

National Foreign Trade Council will hold its annual Convention for 1932 at Honolulu—May 4, 5, and 6.



North German Lloyd steamer Este of the direct Pacific Coast-European service of the North German Lloyd unloading Pacific Coast products at Bremen. Note the grouping of cranes working on a single hatch, both to quay and to lighters.

San Francisco Bay Preparing for New Commerce

II. Port of Oakland

UNDER the intelligent supervision of its active and enthusiastic Board of Port Commissioners, the Port of Oakland is not only furnishing shippers with ample fire-proof, modern facilities for the collection and distribution of cargoes and furnishing steamship operators with adequate docking space but is also actively going out to sell these advantages to both shipper and ship operator. This Board consists of five men; namely, Ralph T. Fisher, president; R. A. Leet, vice-president; Leroy R. Goodrich; Dr. George C. Pardee; and B. H. Pendleton.

Charged with the job of building an adequate port for Oakland and voted a bond issue of ten million dollars to meet costs, the Board sought for a man to put in charge of this work and selected G. B. Hegardt who had built up a wonderful port at Portland, Oregon. Mr. Hegardt, assuming the office of port manager and chief engineer, brought with him from Portland a large part of the engineering organization that he had used there, including A. H. Abel, whom he appointed assistant port manager and assistant chief engineer.

With characteristic energy, Chief Engineer Hegardt laid out a plan for the development of the inner, middle, outer and north harbors of Oakland and began work on this development in conference with the shippers who were expected to use the developed terminals, in several cases actually building the facilities to suit the particular needs of these shippers. This policy led to the design of very spacious, modern, fire-proof and permanent docks, piers, and pier sheds, which are a credit to the City of Oakland and a great asset to the commerce of San Francisco Bay.

The Port Commission of Oakland now owns:—Modern docks and quays having 10,425 linear feet of berthing space; modern pier sheds having 591,620 square feet of floor area; warehouses having 646,220 square feet of floor area; a fine yacht harbor with capacity for seventy yachts; the municipal airport with modern buildings, including an administration building, five large hangars, and a fine hotel and restaurant. In addition to these active waterfront properties, Oakland, through its Port Commission, holds title to enormous unleased tidal flat areas both submerged and reclaimed which are capable of easy development for future enlargement of her scope as a port so as to give her at reasonable cost many times her present facilities.

There are also many privately owned commercial and special purpose wharves on Oakland's waterfront. Roughly, these facilities would aggregate:—20,000 feet berthing space, and sheds with a floor area of 200,000



The bird's-eye view of the Port of Oakland inland waterway terminal on Oakland's inner harbor.

square feet. On the leased reclaimed lands adjoining some of the privately operated terminals there is much opportunity for further improvements.

Within the limits of the Port of Oakland there are located two major shipbuilding and ship repair plants and many boat yards. These establishments operate twelve floating docks and marine railways, with an aggregate lifting capacity of 56,000 tons, and with one floating dock capable of lifting 15,000 tons.

Oakland is served on the land side by three transcontinental railways—Southern Pacific, Santa Fe, and Western Pacific. By means of these railroads, a splendid system of concrete highways, and by bay and river routes it enjoys close and economical transport relations with its central California hinterland. Four passenger ferry lines, two vehicular ferry lines, three freight car ferries, and a number of transbay barge services connect Oakland's waterfront with frequent and dependable service to and from the waterfront of San Francisco.

Oakland's Port Commission has a considerable portion of its \$10,000,000 still available, its present facilities are on a comfortable self-supporting basis, its credit is good when more funds for large improvements are deemed necessary. Thus the Port of Oakland, situated on the easterly shore of San Francisco Bay and facing the Golden Gate, looks forward to an ever enlarging commerce on the Pacific, confident that she will be able to meet the ships of the future with adequate port facilities.

Trade Convention

United States Chamber of Commerce will hold its annual Convention in San Francisco, May 17 to 20. Speakers to include such national figures as Calvin Coolidge, Owen D. Young, Charles H. Dawes, and James A. Farrell.

OAKLAND TERMINALS

Some interior and exterior views of the well designed, roomy municipal piers, pier sheds, and warehouses of the Port of Oakland.

- (1) Interior of Section B, Grove Street Pier.
- (2) Interior of Shed No. 1, Outer Harbor Terminal.
- (3) Interior of Shed No. 2, Outer Harbor Terminal.
- (4) Line-up of vessels at Outer Harbor Terminal.
- (5) Discharging direct to railway car at Market Street Pier.
- (6) Unloading cargo at Grove Street Pier east berth.
- (7) Switching cars at Warehouse A, Outer Harbor Terminal.
- (8) Intersection of Fourteenth and A Streets, Outer Harbor Terminal.
- (9) Looking north on A Street, Outer Harbor Terminal.
- (10) Unloading rail freight at Outer Harbor Terminal open pier area.
- (11) Discharging lumber at Ninth Avenue Pier.
- (12) Quay area, showing west and east berths of Grove Street and Market Street Piers, respectively.

[Courtesy of Port of Oakland (Continued)]



(1)



(2)



(3)



(5)

(4)



(6)



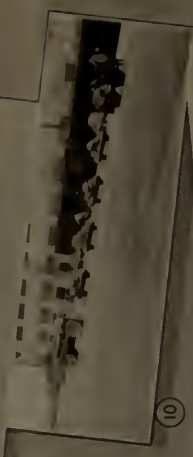
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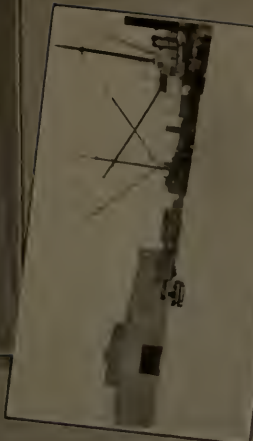
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American Trade on the Pacific

Some Notes on the Volume and Importance of the Overseas Commerce of the United States with Countries Bordering the Pacific Basin

KEEPING step with world-wide trends, the nations bordering the Pacific Ocean, including ourselves, are all busy building high tariffs for revenue and for protection of home industries. Unfortunately, in many cases these measures fail to supply the revenues expected and fall far short of providing protection, while they actually interpose such barriers in the stream of international commerce as to greatly retard the free flow of that stream and make almost impossible the establishment of any international balance of trade.

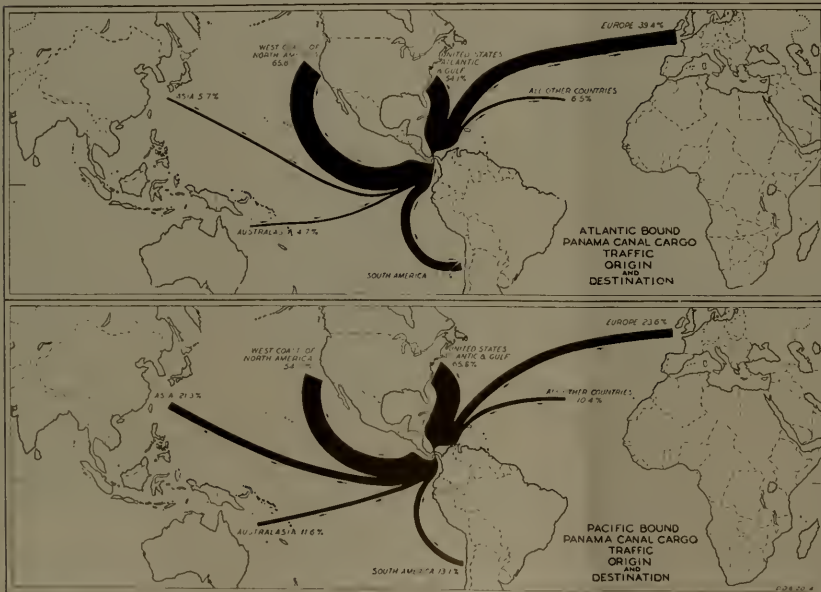
This high tariff trend, aided by military activities of Japan in the Shanghai area and in Manchuria, has had a decided dampening effect on trade in the Pacific area. In these days of depression, the decrease in foreign trading activities is much more acutely felt than would be the case in normal periods of domestic trade. The Chamber of Commerce at San Francisco, roused to action by this acute pressure, has declared for a new and enlightened tariff policy; and other chambers are advocating the same idea.

San Francisco Chamber's declaration of Tariff Policy has been widely circulated but is worth while repeating here. It reads:

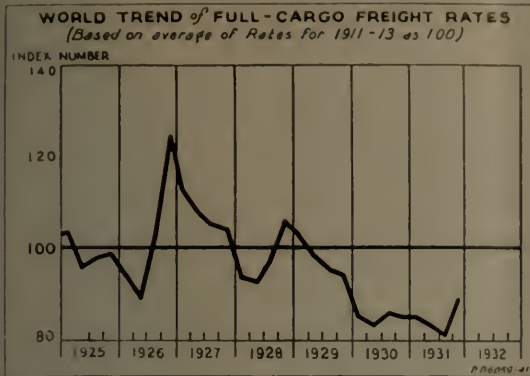
"We believe that the principle of protectionism judiciously and scientifically applied is sound, but that when carried to the point reached by our recent tariff acts, it restricts foreign trade and adversely affects prosperity. Those concerned with the problems of our international economic relations are convinced that our

tariff policy since the war is inconsistent with our new position as the leading industrial, financial, and commercial nation of the world. As we have restricted imports we have curtailed exports to the serious detriment of agriculture, our mass production industries, and the American merchant marine. Foreign markets are necessary as an outlet for our growing surpluses. Interest on our foreign investments and war debts cannot be paid if we proscribe imports. We must accept the implications of our creditor position and the logic of our industrial advance. San Francisco is a great port and depends for its well being on commerce. We believe our hopes for the development of Pacific trade and shipping and San Francisco's harbor will not be realized under our present high tariff policy. Our members engaged in export business are finding increasing difficulty in negotiating business abroad because of the retaliation of foreign governments to our own high rates. Our steamship lines are suffering loss of business. Because the revival of our foreign trade depends on the liberalization of the commercial policy of our customer countries as well as our own, we urge upon Congress the establishment of machinery for reciprocal concessions in tariff rates in the interest of the revival and upbuilding of our foreign commerce."

This declaration places the responsibility squarely up to Congress. We, through our Congress, have started the nations of the world on a policy of exclusion, protection, high barriers against international trade.



An interesting diagrammatic map showing the flow of traffic through the Panama Canal.



This graph shows world trends. With minor differences, the Pacific freight rates would follow the same curve.

We, therefore, (again through our Congress) should start the world into a sane reconsideration of this policy and make our aim the sane encouragement of all legitimate international commerce.

Other disturbing factors in the Pacific Area are continued depression of Japanese and British currency and low silver, which greatly depreciate the purchasing power of oriental markets for American products.

Total tonnage of goods loaded and discharged for overseas trade at ports in this area show considerable decline in 1931 as compared with 1930, and the latter year was considerably below normal. In Japan, for instance, there was a decline of 15 per cent. in the total; and this was made up of a loss of 23 per cent. in exports and 13 per cent. in imports. Australia's overseas total had declined only 5 per cent., and that on the rather remarkable showing that her exports had increased 25 per cent. and her imports decreased 26 per cent. Panama Canal Traffic decreased 17.8 per cent. and Suez decreased 10.7 per cent. During this twelve-month period, American overseas tonnage declined nearly 20 per cent. (All figures upon which these percentages are calculated exclude petroleum in bulk.)

Including the West Coasts of the two Americas, the Pacific Area overseas tonnage into and out of ports of the United States in direct trade during the fiscal year

ending June 30, 1931 approximated 16,000,000 tons. During June 1931 the total moved into and out of American ports to and from this area was 1,253,000 tons, of which American vessels carried 352,000 tons, British vessels 294,000 tons, and vessels of other flags 607,000 tons. In other words, foreign flag vessels carried approximately 72 per cent. of this tonnage and American vessels 28 per cent. These figures are compiled from reports of the United States Shipping Board Bureau of Research. The total movement of overseas tonnage in the ports of the United States for June, 1931, was 6,854,000 long tons, of which 2,525,000 tons moved in American flag bottoms and 4,329,000 tons moved in foreign flag vessels, a ratio of over 62 per cent. in foreign ships and less than 32 per cent. in American ships.

These figures ought to teach us that we should wake up and work more energetically to keep our place on the sea. The Pacific Ocean Area is to be the arena of the world's great future progress in trade. The United States, on her Pacific Coast, has strategic entrance to this arena and should do her utmost to make that entrance as useful as possible. United States holds also the great "Crossroads of the Pacific" at Honolulu, which both from a commercial and a naval point of view gives her immense advantage in building up prestige in the Pacific. United States has molded the Philippines into a great source of trade and is building there a strong, freedom-loving race, who, whether independent or an integral part of the Commonwealth, will always look to America for inspiration and leadership. These are all great advantages.

We have the friendship of the great majority of the nations that rim the Pacific to a much higher degree than we have that of the other half of the world. We need their products; they need ours. Great strides have been made in American shipping and foreign trading services on the Pacific during the past ten years—greater perhaps than during any decade of the past. Apparently there is room for even greater progress in the future.

It is significant that the National Foreign Trade Convention is to be held this year in Honolulu. Let us hope that American Foreign Traders at this meeting will let their "vexed and tired" eyes feast on "the wideness of the sea" and that they may become inspired to greater heights of leadership and clearer calls for service.



The new Dollar Liner President Hoover. The present ship-building program in the United States is largely composed of ships of this character for Pacific service, indicating the confidence of American shipowners in the future of overseas trade on the Pacific Ocean.

Italian Super-Liners

Italy Makes Bid for Transatlantic Supremacy with Two 50,000-Ton Liners of Unusual Design

By R. C. W. Courtney

THE distinction of commissioning the largest and fastest ships of the present year will fall to Italy where the luxury liners Rex and Conte di Savoia are now completing afloat preparatory to entering the New York-Genoa express service during the forthcoming summer. The construction and operation of these ambitious vessels have been made possible by state subsidies issued through the medium of the Italian Naval Credit Institution, but it is fully anticipated that they will considerably develop the passenger traffic from America direct to Southern Europe, especially as the crossing will be reduced to seven days. The ships were originally to have been managed by the Navigazione Generale Italiana and the Lloyd Sabaudo, but will be now operated in connection with the new L'Atlantica combine which has been formed under a centralization scheme embodying the principal Italian shipping companies.

The Rex will be slightly larger than her consort, with an approximate gross tonnage of 50,000 as against 48,000, the principal dimensions being 880 feet overall length, 834 feet between perpendiculars, with an extreme breadth and depth to the upper deck of 102 feet and 120 feet. The builders are the Ansaldo Company of Genoa-Sestri, who have in the past built many of the principal Italian liners and warships; and the work of bringing the hull structure to the launching stage on July 30 last was accomplished in 14 months. The general design incorporates a raked stem terminating in a bulbous bow which, however, does not appear to be quite so pronounced as in the Bremen and Europa. The stern is of the counter type, somewhat similar to that of the Mauretania and the German prewar express transatlantic liners, with an underwater rudder of Oertz pattern. There will be eleven decks in all, whilst the hull is subdivided into fifteen water-tight compartments and it is stated that the ship will remain afloat with any three open to the sea. In addition, the double skin system of construction has been adopted for a distance of 443 feet in the region of the machinery spaces with a view to still further minimizing the risk of flooding. Accommodation is being provided for 400 de luxe passengers, 250 first class, 300 second, 400 tourists, and 900 third class passengers, in addition to a crew of 900. Outstanding features will be the incorporation of a theatre available to all classes and two open air swimming baths located on the sun deck, one of which will be for second class passengers. The quadruple screw propelling machinery has been constructed by the shipbuilders and comprises four independent sets of single reduction geared turbines of the high pressure, high temperature type taking steam from 14 oil-fired water-tube boilers and together developing from 100,000 to 120,000 shaft horsepower for a service speed of not less than 27 knots. All the auxiliaries are in duplicate, so that a complete breakdown will be next to impossible; and the lifesaving equipment includes twenty large lifeboats each carrying 145 persons.

The Conte di Savoia has been built at the San Marco establishment, Trieste, of the Cantieri Riuniti dell'Adriatico, where the construction has also been effected with great rapidity as the keel plates were laid in October 1930 and the ship was launched in just over twelvemonths later. In this case the length is 811 feet over-all, the molded breadth 95 feet 10 inches, and mean draft 30 feet 6 inches. The bow is also designed with a bulb at the forefoot and a rounded plate stem; but the stern is distinctly of the cruiser pattern with an exceptionally fine water-line. The vessel has been built to the highest classification of Lloyds Register and complies with the U.S.A. legislation in regard to passenger carrying ships as well as the regulations of the Convention for the Safety of Life at Sea (1929). There are ten decks and a sun deck, and subdivision is again on an extensive scale, with a double hull and longitudinal bulkheads in way of the machinery and amidship spaces. Three classes of passengers are to be carried, the total being 2300 which, with a crew of about 700, will bring the full ship's complement to 3000. The first and second class public rooms, with the exception of the dining saloons, are located on the boat and promenade decks, a noteworthy feature being the Great Hall measuring 117 feet by 65 feet and having a minimum headroom of 24 feet. Extensive provision stores and baggage rooms are arranged together with a garage accommodating 30 automobiles which are loaded through large gangway doors in the side of the vessel. Two motor lifeboats and 22 craft equipped with hand propelling gear will be carried, each having a seating capacity for 138 persons, and launching will be effected by Welin-MacLachlan and Libani types of davit.

The power plant is to consist of four sets of Parsons type three-casing single-reduction geared turbines arranged in two compartments, and ten large Yarrow-type high-pressure boilers with superheat will supply steam. There are three boiler rooms and three cylindrical boilers are also provided for delivering steam to auxiliary machinery used in connection with the main installation. The total power will be in the region of 120,000 shaft horsepower which approximates to that of the Rex, and whilst the service speed is also stated to be 27 knots there is every indication that this figure will be considerably exceeded. Electric power to the total of 5300 kilowatts is supplied by two diesel-driven generators, four turbo-generators and several smaller sets, the engines of the first mentioned having been supplied by Burmeister & Wain. All the deck machinery is actuated by electricity together with the accommodation heating plant and the various hotel services. A noteworthy part of the equipment is the installation of three Sperry gyro-stabilizers with a view to minimizing rolling action. These have been constructed by Vickers-Armstrongs and are located in the fore part of the ship at about sea level and comprise the largest apparatus of this type so far fitted in a ship. Each unit

weighs 200 tons and is composed of a 560 horsepower alternating-current motor actuating a rotating element of about 100 tons in weight at a normal speed of 800 revolutions per minute, the diameter of each rotor being 13 feet.

Cosulich Motor Liners

Brief mention should also be made of the two high class diesel-driven Cosulich liners *Neptunia* and *Eridania* which are being built at the Cantieri Riuniti for the Trieste-South American trade. These ships, although of smaller dimensions; namely, 570 feet by 75 feet 6 inches by 45 feet with a gross tonnage of about 20,000, are nevertheless of considerable interest, as with the exception of the new *White Star Georgie* they are the largest and fastest motor vessels now under construction. The general arrangement will be on somewhat similar lines to the well known *Vulcania* and *Saturnia*, with a lofty but compact superstructure amidships, upright masts, and a single exhaust stack of large dimensions. The bow is of the plate type with

considerable forward rake and terminates in a bulbous forefoot. The propelling plant of the *Neptunia* is unorthodox as it consists of a quadruple screw arrangement of Sulzer type single-acting diesels collectively developing 20,000 brake horsepower for 19 knots, two of which have eight and the others nine cylinders, the bore and stroke in each case being 680 and 1200 millimeters, whilst in type they will be similar to the power units of the express motorship *Victoria*. Completion is due to be effected in September next, and the *Eridania* will follow in the early spring of 1933. The machinery in the later case will comprise four Fiat single-acting two-cycle engines each having eight cylinders 750 millimeters diameter with 1000 millimeter stroke and together developing 19,000 brake horsepower at 125 revolutions per minute. Accommodation is to be provided for 1550 passengers in three classes, the majority being in the third class, where the public rooms will include a lounge, smoking room, and music saloon, together with a swimming pool and separate promenade deck.

League of Nations' Survey

Phases of World Depression with Respect to Ocean Shipping

By Francis M. Mansfield

REATING of trade relations in the Pacific, the League of Nations, with the collaboration of nineteen international research organizations, of which the United States Committee on Recent Economic Changes and the International Chamber of Commerce took part, has issued a voluminous report dealing with the World Economic Depression.

It emphasizes the fact that the first reflexes of the recent years violent disturbances in production and prices were to be observed in international trade—ergo, shipping.

The index numbers of ocean freight rates as quoted from (1) the Economist, (2) the Statist, and (3) the Statistisches Reichsamt are as follows, taking the base of 100 as of 1913.

	(1)	(2)	(3)
1927	110	119	106
1928	99	110	102
1929	97	106	109
1930	79	82	92
1931, January to April	81	85	88

Despite the variance of the three authorities quoted, the slump in these index numbers may be considered a first hand indication of the advance of world depression, as dependable at least as that usual yard-stick of measurement, the consumption of electrical power.

Shipping rates ever since the war have tended to decline and have been relatively low as compared with other world prices. The fact that even during the summer of 1929 more than 5 per cent. of world tonnage was laid up indicated that a considerable surplus existed. This has tended to restrict the revenues of important companies while lesser tramp traffic suffered even more.

In 1931 twenty-five countries representing 99 per cent. of European commerce found the ocean carrying trade had fallen with respect to the same period in 1929, 29 per cent. for imports and 28 per cent. for exports. That of North America, Canada and the United

States, actually fell off 48 per cent. and 50 per cent. respectively. United States trade with Australia fell but 10 per cent., and that with Japan 23 per cent.

The value of international trade had increased from \$33,150,000,000 in 1925 to \$35,343,000,000 in 1929, then began the drop and likewise its volume, which brought a lag in shipping rates based upon the inexorable law of supply and demand for cargo space.

Factors which brought about the fall of freight available in the Pacific area are: Chile's exports falling from 1929 to 1930 by 42.1 per cent., those of Japan 31.9 per cent., and Australia 26.3 per cent. The depreciation of the Chinese tael—silver as compared with gold—brought about a sluggish movement in Chinese trade which today stands at but 2.5 per cent. of total world trade. From the vague figures available, according to League statisticians, it is difficult to say whether imports or exports has declined the more. In any case the figures applying to China trade have altered in very much the same way as those of other countries depending upon primary products. The exports of the United States and Japan to China have fallen off in much the same proportion as those to other countries, while the decrease in exports of the United Kingdom to China were considerably greater. British India's trade with China has been adversely affected by the depreciation of silver.

It is pointed out that the downward tendency of shipping rates has been affected by the fact that shipbuilding was continued on a large scale up to 1930, though it fell off during that year. Total world tonnage exceeded 70,000,000 tons in June, 1931, or 3,000,000 more tons than in June, 1929. In 1913 it was about 47,000,000 tons.

The League report states that shipbuilding, referring to vessels under construction, in the second quarter of 1931, was 346,000 tons less than in the second quarter of 1930. For Great Britain this was 207,000 tons less, for the United States 31,000 tons more, for Germany 38,000 tons more, and for Italy 16,000 tons more.

Unfair Competition To the Merchant Marine

*Army and Navy Transport Services and Panama Rail Road Steamship Line Take
Business from American Privately Owned Lines*

*By H. B. Walker, President
American Steamship Owners' Association*

IN times of peace no nation other than the United States transports its men and supplies for military stations outside its borders on government transports. It is admitted that when the Transport Services of our Army and Navy were started there was not the frequency of service which private lines maintain to-day and in many cases there was no service at all to points where the Army and Navy desired to convey their men and supplies. This condition no longer exists, and lack or infrequency of service cannot be said to be a reason for their continuance. The transports are now in the main operating to Panama, Corinto, Honolulu, Manila, Shanghai, Japan, and Porto Rico from the selected ports on the Atlantic and Pacific Coasts.

Between these overseas ports and the ports of the United States there is a far greater frequency of sailings maintained by private lines than the transports can supply. These lines are entirely able to take care of the transportation needs of the War and Navy Departments at a cost substantially less than the cost of the maintenance and operation of the transports.

The government, through loans for the construction and reconditioning of the ships of many of these private lines, has a direct financial interest in them, and the continued operation of the transports deprives these lines of a considerable volume of freight which, if they were permitted to carry, would assist materially in supporting them and in making it possible to repay these loans.

Cost of Transport Operation

The Army alone has asked for an appropriation of \$4,400,000 for the operation of the Army transports. Those who are familiar with the cost of operation of ships know that this amount is far less than the actual cost. These figures do not take into account a charge for depreciation, insurance, or interest, and we believe there are handling charges which rightly belong to operating costs that are not included. From the best information which we are able to obtain, if the transportation of the personnel of the Army and their supplies were turned over to the private lines, there would be a saving of from two to two and one-half million dollars annually in addition to a better and more frequent service.

There is also the indirect aid which would accrue, and this is also true with respect to naval supplies, of an increased purchasing market. Private lines not only operate their vessels from the American ports from which the Army and Navy transports operate, but from

a great many other ports. If their freight was to be handled by the private lines, a great many more suppliers in the United States would have an opportunity to bid, knowing that they would not be barred because of higher inland freight rates than other competing manufacturers and suppliers enjoy. Shippers in the Middle West would have an opportunity of bidding and shipping via the most economical route, where now if they bid they are compelled to ship to the ports from which the Army and Navy transports depart, and figure in their bid the cost of the inland transportation. This factor frequently precludes the possibility of their being successful because of the fact that the location of some of their competitors is such that they enjoy a lower freight rate to the port of egress. From the point of view of the manufacturer or supplier it would, therefore, put all on a basis as nearly equal as their location to the various ports will permit.

Panama Railroad Line

With respect to the Panama Rail Road Steamship Line, it can be said that there was a real need for the service it rendered at the time of its commencement. This service to-day is operated in competition with private lines without the slightest justification. They not only carry government freight but furnish very virulent competition for the carriage of private freight. As a matter of fact, this line not only engages in the transportation business between the Panama Canal and New York, but until recently operated a service down the West Coast of South America, and since its withdrawal has placed the boats in the trade between the Canal, Haiti, and New York. There is no fair reason for making the ports of Haiti ports of call as there is now and has been for some time a service between New York and Haiti which has been able to fully take care of the requirements of the trade. The fact that the Panama Rail Road Steamship Company is accepting freight for these ports, makes only more difficult the operation of the privately-owned line in this trade.

This statement is equally true with respect to the business carried on by the Panama Rail Road Steamship Line to the Canal Zone. In normal times there is in addition to the lines regularly serving the Canal Zone practically an intercoastal sailing a day from New York and numerous sailings to and from other ports. These services are more than ample to take care of the needs of the Canal in so far as transportation is concerned. As a matter of fact, the Panama Rail Road

Steamship Line here again does not confine its activities to the carrying of government freight but extends its activities to competition with the regularly established lines for commercial freight. To show to what an extent this is true I quote from a statement showing the freight tonnage carried to and from various ports by the Panama Rail Road Steamship Line during the fiscal year ending June 30, 1931:

"Fifty eight thousand nine hundred and five tons of government freight were transported to Cristobal from New York as against 22,399 tons of commercial freight. To Panama 848 tons of government freight were carried, as against 11,747 tons of commercial freight. There was no government freight to Central America but there were 4638 tons of commercial freight. To Haiti there were 777 tons of government freight, as against 12,803 tons of commercial freight. The Panama Rail Road Steamship Line also transported 12,092 tons of commercial freight for Southern Pacific ports, as against no government freight for these ports. The total southbound movement of government freight equalled 60,530 tons and produced \$404,225.22 in revenue, as

against a total southbound movement of 63,679 tons of commercial freight producing \$479,729.95 in revenue. Northbound there was a total movement of 795 tons of government freight producing \$9,689.23 in revenue, as against a total northbound movement of 38,460 tons of commercial freight producing revenue amounting to \$287,794.97. The total movement, both north and southbound, for the year equalled 163,463 tons, of which private freight totaled 102,139 tons and government freight 61,325 tons, the total freight revenue being \$1,181,439.37, of which commercial cargo paid \$767,524.92 and government cargo \$413,914.45."

These figures speak for themselves and show very definitely, in my opinion, that not only is there no real value to the government in a continuance of this service but that it constitutes a serious handicap to the private lines operating in this trade. This line is being operated at a loss to the government and in the interests of economy should be discontinued, together with the Army and Navy Transport Services, without delay.

[Abstract of Address before the Fifth National Conference on the Merchant Marine.]

Accident Prevention at Pacific Coast Docks

Some Safety Records for 1930 and 1931

ON the Pacific Coast in 1930 and 1931 some real accident prevention records were reported to the Accident Prevention Department maintained jointly by the Pacific American Steamship Association, the Shipowners' Association of the Pacific Coast, and the San Francisco Waterfront Employers' Union. These records are published here with the permission of each company.

A.—Company Records—Stevedoring

1. During 1930 all companies operating in San Francisco Bay as a group averaged about 6000 man-hours per lost-time injury. For every million tons of cargo stevedored, 80 longshoremen received lost-time injuries.

2. In 1930 the best reported company frequency rate for stevedoring was Matson Navigation Company, Crockett Division; E. Anderson, superintendent. He had a rate of 28,000 man-hours for each lost-time accident. During the year, he had 9 perfect no-accident months with one period of 90 days and another of 120 days without injuries to any member of the three gangs, totaling 40 men.

3. In 1931, the Pacific Steamship Company, San Francisco Operations, and the Los Angeles Steamship Company, San Francisco Operations, seem to have tied for first honors for a continuous period, with a rate of 50,000 man-hours per lost-time injury. The Pacific Steamship Company of San Francisco has one gang that has worked 27 months without a lost time injury, the total man-hours exceeding 60,000. Another gang has a record of 18 months, or 40,000 hours.

4. The Luckenbach Steamship Company, San Francisco Bay Stevedoring Operations, in one continuous period in 1931, obtained a rate of 40,000 successive man-hours per lost-time injury. This company, over a period of five years, has been a consistent leader in accident prevention rates.

5. The California Stevedore & Ballast Company of

Gang Leader	Company	Port	Months in Gang	Per. with-out Injury 1930-31
F. Kaseh	Pacific S. S. Co.	S.F.	15	27 Months
H. Chr.	" " " "	S.F.	15	18 "
C. Olson	Calif. T. & P. Co.	S.F.	18	14 "
C. Hoken	" " " "	S.F.	18	14 "
A. Strand	" " " "	S.F.	18	13 "
H. Heston	Metrop. Steved. Co.	L.A.	1	13 "
C. Aldridge	" " " "	L.A.	1	13 "
W. Sullivan	" " " "	L.A.	1	13 "

Table showing record of stevedoring gang leaders in "No Injury" periods.

San Francisco has one group of three gangs (total 54 men) that have worked 100,000 man-hours without lost-time for any man on account of injury and are still going strong.

6. The Metropolitan Stevedoring Company of Los Angeles also has a group of three perfect gangs, totaling 30 men that have worked 47,000 continuous hours without an injury causing lost time.

B.—Gang Leaders

Eight gang leaders have worked the entire year of 1931 without lost-time injuries to any member of their gangs. Some of them, as shown in the table, started their no-lost-time periods prior to 1931.

C.—Overhauling Ships

An outstanding record in the overhauling of ships was attained in 1931 by the American-Hawaiian Steamship Company, A. Hansen, general foreman. His average was 26,000 man hours per lost time injury. In 1927 the company's average was 4800 man-hours per lost-time injury.

Pumps for Marine Service

By I. W. Jackman,* O. H. Dorer, H. M. Chase**

Part III.—General Characteristics of Reciprocating and Rotary Pumps

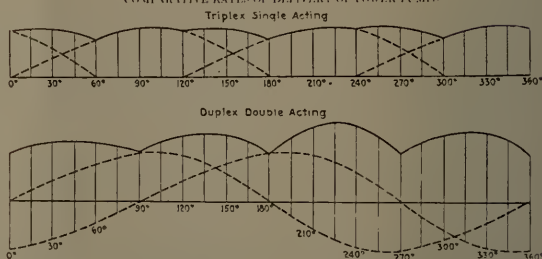
PRESENT marine steam engineering practice tends definitely toward increased operating economy by the use of higher steam pressures and temperatures, by refinement in the design of mechanical equipment, and by the salvage of heat units formerly wasted.

Pump builders have found it necessary to redesign their direct-acting steam pumps for higher pressures and temperatures, to obtain increased efficiency, decreased weight, and smaller space requirements, and to produce new designs of efficient motor-driven positive displacement pumps where neither the direct-acting steam pump nor the centrifugal can be utilized to advantage.

Steam Pumps.—Steam pumps are direct acting, generally of vertical type, as this permits alongstroke pump which requires but small floor space. The conservation of the exhaust steam and the return of the condensate to the boiler requires that the exhaust be free from oil contamination, and therefore steam pumps are generally required to operate without lubrication in the steam cylinders. For such an operating condition, the simplex pump is better suited than the duplex pump. The vertical type also has preference, as the weight of the pistons is not carried by the bore of the cylinders. The simplex pump has a further advantage over the duplex in that normally it runs a greater percentage of its designed stroke, resulting in smaller cylinder clearance and proportionate saving in steam consumption. For severe suction conditions, where there is a possibility of the pump temporarily losing its supply, or for high temperature liquids with the possibility of vaporization, the simplex pump—due to its positively controlled length of stroke—will more readily regain its suction than the duplex pump. For some services where it is essential to keep the discharge flow and pressure as steady as possible, the duplex pump is to be preferred, since the overlapping strokes of the two sides eliminate the slight drop in flow and pressure that occurs when the simplex pump reverses.

Pumps with cast iron steam cylinders are available up to 450 pounds steam pressure. The higher pressures and temperatures, which future requirements seem to indicate, call for a material of higher strength and less growth than ordinary cast iron. Sound steel castings, free from porosity, are difficult to obtain at this time in the complicated sections required for steam cylinders. Furthermore, the steel casting does not offer a good wearing surface for pistons and valves. Special alloy close-grained irons, of low creep factor and high strength at high temperature, are best suited to this service. As a result of extended research and experiment, castings are available in mixtures showing a tensile strength as high as 50,000 pounds per square inch

COMPARATIVE RATES OF DELIVERY OF POWER PUMPS



Flow curves of duplex and triplex pumps. Distances measured on vertical lines represent velocities and delivery. Distances measured on horizontal lines represent intervals of time. Total length of curves represents time taken up by one revolution.

at a temperature of 700 degrees Fahrenheit. Valves and valve faces of nitralloy steel have shown the possibilities of greatly reducing the wear and corrosion of these parts.

In the liquid end, valves and seats of stainless steel forgings give longer life and freedom from corrosion. Cylinder linings of centrifugally cast monel metal or of nitralloy steel or of chromium plated steel may be used to give a greatly extended length of service.

Reciprocating Power Pumps.—In small and medium capacities and at any pressure, motor-driven reciprocating power pumps offer the highest efficiencies. They will give efficiencies from 75 per cent. for a 15-horsepower unit up to 90 per cent. for a 150-horsepower unit.

These pumps are generally either horizontal duplex or vertical triplex. The vertical triplex pump is to be preferred on account of smaller floor space and less expensive foundation and for its more uniform flow characteristic. For shipboard service, the power pump is generally limited to a stroke of 12 inches; otherwise its space requirement is excessive in the horizontal machine, and the weight and height of the vertical machine are excessive. The gradual increase and decrease in piston speed and in flow through the valves permit easier seating of the valves than in the case of the abrupt change encountered in the direct-acting steam pump. Speeds are largely dependent on the nature of the service and under some conditions may go to 100 revolutions per minute, possibly higher in the very small sizes. The outside packed plunger type allows ready access to the packing, thus reducing slippage and wear of linings. The development of totally enclosed power ends carrying superimposed motors with complete lubricating systems for bearings and gears insures clean and quiet operation and minimum space requirements.

In the selection of a pump for a definite service, all of the foregoing general points must be taken into consideration.

*Manager, Marine Sales, Worthington Pump and Machinery Corp.

**Paper read at Annual Meeting of the Society of Naval Architects and Marine Engineers, November 19 and 20, 1931.

Some New Materials in Shipbuilding

(Concluded)

By William E. Blewett, Jr.*

Assistant to the President, Newport News Shipbuilding and Dry Dock Company

THE developments in bathroom fixtures are well worth noting, for beyond a doubt the decoration of the bathroom is now being given more thought than ever before. Today, color in plumbing fixtures which was rejected twenty years ago is received with enthusiasm.

In the modern bathroom the wall tile and fixtures must constitute a simple color scheme, for it is then not only more livable but more distinguished. Such a scheme is usually accomplished by having two lesser colors combined with one dominating color, but to obtain the proper matching of the colors is quite a problem.

The wall tile is a different material from the enameled iron or the vitreous china of the fixtures, and the processes used in firing these substances vary materially. Color in tile, vitreous china, and enamel is obtained by the use of metallic pigments, but as color itself has no substance it cannot be used without regard for the material of which it becomes a part. The character and texture of the material have much to do with determining the value of color, and it is a fallacy to attempt to perfectly match colors in unlike materials. Therefore, the color scheme must be such that a perfect match in the color of the wall tile, the vitreous china soap dish, and the enameled iron bathtub is not required.

Considerable advancement has been made in bathroom fittings not only in the design but particularly in the finish. The nickel or white metal finish is rapidly being replaced by the much more durable and lasting chromium plate. Faucets, escutcheons, and handles may be obtained in designs in keeping with the china and enameled fixtures, but, being of entirely different material, the problem of selection is not so difficult.

For toilets, showers, and baths there is a material made from melted rock, the basic ingredients being silica, sand, sodium, calcium, and alumina. These rock ingredients are fused at 2600 degrees Fahrenheit, which produces a natural fire polished vitreous product quite adaptable to many uses in the marine field, especially for wainscoting, partitions, trim around lavatories, etc., in these spaces. It is impervious to stains and all acids except hydrofluoric, will not craze or discolor, and is not affected by warmth, moisture, or salt air. It is made in either tile pattern sheets or in plain slabs, and is available in seven basic colors—white, ivory, black, blue, gray, apple green, and olive green. Many combinations are to be had from these seven basic colors for decorated caps and borders. There are five kinds of surface texture—flame glaze, matte, embossed, polychrome, and Tiffany faience. Before erecting this material, all bulkheads are given a coat of bitumastic solution, and it is then installed either by means of screws and porcelain or metal rosettes or by plastic cement.



A whaling scene etched on stainless steel. This illustration is typical of many decorative effects obtainable by the use of metal panels.

A considerable quantity of this material is used as trim around the lavatories on the two new Dollar Line vessels, steamship *President Hoover* and *President Coolidge*.

Swimming-Pool Tile

Now that outdoor swimming pools are becoming the vogue, it is important that particular attention be paid to the tile construction. The durability of any tile when exposed to freezing weather is largely dependent upon the installation, but some tiles are better constructed for exposure to water and moisture than others.

Glazed tile with a porous white body should particularly be avoided, and an unglazed mosaic or vitreous tile should be used instead. The vitreous tile will absorb only about 2 per cent. moisture, against 6 to 10 per cent. for glazed wall tile. If a glazed tile is desired, some manufacturers are able to furnish a colored vitreous tile with a glazed surface. However, there is always a possibility of the glaze chipping, particularly when the tile is subjected to vibrations and large temperature changes.

Metal-Sprayed Materials

Metal spraying is a process by which metals in the form of wire are passed through an oxy-acetylene flame and impinged upon surfaces of like or unlike materials by compressed air. This process opens up a new field—that of obtaining the characteristics of two metals without impairing the quality of either. For example, a door may be made of steel for lightness and strength, and coated with brass for decorative purposes.

There are many uses to which this metal spray may be applied and its advantages are numerous, but it also has its limitations. With the exception of platinum, nearly all metals that can be obtained in wire form can be sprayed, but unfortunately the very desirable metal chromium is not so obtainable. However, if metal in

*Paper read before the Society of Naval Architects and Marine Engineers at New York, November 20th, 1931.

Name of wood	Geographical origin	Name of wood	Geographical origin	Name of wood	Geographical origin
Araucaria (Araucaria melanoxylon)	Argentina	Cinnamodora	Domestic	Pine, Kasai (Agathis australis)	Australia
Avicoria = African Mahogany	W. Africa	Gum, Black (Nyssa sylvatica)	Domestic	Pine, Short-leaf (Pinus echinata)	Domestic
Ayer = African Mahogany	W. Africa	Gum, Red (Liquidambar styraciflua)	Domestic	Pine, White (Pinus strobus)	Domestic
Ayres (Shorea cumia)	Philippines	Hardwood (Acer pseudoplatanus)	England	Poplar, Black (Populus nigra)	Domestic
Ambeyra (Pterocarpus)	Dutch Malaya	Italy, America (Hesperia)	Domestic	Poplar, Carolina (Populus deltoides)	Domestic
Angeli (Dicoryna parsonsii)	French Guiana	Holly, English (Ilex aquifolium)	England	Poplar, Yellow = Tulip Tree	Domestic
Apitong (Dipterocarpus grandiflorus)	Philippines	Honeysuckle = Res.	Australia	Porcupine Wood (Coccoloba nucifera)	India
Ash, Black (Fraxinus nigra)	Domestic	Isoko (Chlorophora excelsa)	W. Africa	Prima Vera (Tabebuia donnell-smithii)	Central America
Ash, Japanese (Fraxinus spp.)	Japan	Kambala (Chlorophora excelsa)	W. Africa	Purple-heart (Peltogyne paniculata)	Trinidad
Ash, Red (Fraxinus Pennsylvanica)	Domestic	Kingwood (Ameiurus spp.)	S. America, Brazil	Re-wood, California (Sequoia sempervirens)	Domestic
Ash, White (Fraxinus americana)	Domestic	Laborum (Cytisus laborum)	Italy	Re-wood (Kagiba excelsa)	Australia
Avonite (Turraenanthus africana)	W. Africa	Lamao = White Luan	Philippines	Rona (Dacrydium cupressinum)	Australia
Ayona (Triplachloria sclerocaulum)	W. Africa	Luan, Red (Shorea rooseana)	Philippines	Rosewood, African (Lingum conarium)	Africa
Bagaac = Apitong	Philippines	Luan, White (Pentameria conferta)	Philippines	Rosewood, Brazilian (Dalbergia nigra)	Brazil
Balei = White Luan	Philippines	Laurel (Terminalia tomentosa)	India	Rosewood, East Indian (Dalbergia latifolia)	India
Balachenao = Red Luan	Philippines	Lumbo (Terminalia altissima)	W. Africa	Rosewood, Madagascar (Dalbergia spp.)	West Africa
Balang (Shorea balangerana)	Philippines	Leopard Wood = Snake-wood	B. Guinea	Sahira (Lyonia sabira)	West India
Banlang (Logantheria spp.)	Indo-China	Locust (Robinia pseudacacia)	Domestic	Saffronwood (Elaeodendron croceum)	South Africa
Bawood (Tilia africana)	Domestic	Lotus (Nelumbo)	Australia	Samba = Ayous	West Africa
Beech (Fagus americana)	Philippines	Leuca (Leuca glauca)	W. Africa	Sandalwood (Santalum album)	India
Bologna (Stereocaulum trilepis)	West Africa	Maple, Hard (Acer saccharum)	Domestic	Santa Maria (Dalbipodium calaba)	Central America
Borch, Red (Betula nigra)	Domestic	Maple, Soft (Acer rubra)	Domestic	Sao (Hopea odorata)	Indo-China
Borch, White (Betula alba)	Domestic	Maple, German (Acer pseudoplatanus)	Germany	Sapele (Ectandrophragma utile)	Madagascar
Borch, Yellow (Betula lutea)	Domestic	Mahogany, African (Khaya rooseana)	W. Africa	Satin (Bromelia peruviana)	French Guiana
Black Bean (Castanopsis australis)	Domestic	Mahogany, Honduran (Swietenia spp.)	Central America	Satin Walnut = Red Gum	Domestic
Blackwood (Acacia melanoxylon)	Victoria	Mahogany, India = Toon	India	Satinwood (Choroxylon swietenia)	Ceylon
Bowé (Guarea cedrata)	Tamoum	Mahogany, Mexican (Swietenia macrophylla)	Mexico	Satinwood, West Indian (Xanthoxylon spp.)	West Indies
Burwood (Buxus sempervirens)	W. Africa	Mahogany, Philippine Dark = Luan	Philippines	Snake-wood (Leopard Wood) (Pratinera guineensis)	British Guiana
Busham (Didelotia africana)	England	Mahogany, Sun Domingo (Swietenia mahagoni)	Philippines	Spruce, Douglas (Pseudotsuga douglasii)	Domestic
Bullet-wood (Mimosa glabris)	W. Africa	Mahogany, White = Prima Vera	W. India	Spruce, White (Picea alba)	Domestic
Butternut = American White Walnut	S. America, Guiana	Mahogany, White = Prima Vera	Central America	Sycamore, American (Platanus occidentalis)	Domestic
Calamander Wood (Diospyros hirta)	Domestic	Mahogany, White = Prima Vera	French Guiana	Sycamore, English = English Maple	England
Cedar, Mozambique = India Mahogany	Ceylon	Marblewood (Diospyros oocarpa)	Andaman Isl.	Tamo = Japanese Ash	Japan
Cedar, Red (Juniperus Virginiana)	India	Mora (Mora excelsa)	Trinidad	Tangle, Red (Shorea polyperma)	Philippines
Cedar, Spanish (Cedrus odorata)	West Africa	Moringa (Distichlis sp.)	West Africa	Teak, African (Oldfieldia africana)	West Africa
Cedar of Lebanon (Cedrus libani)	Spain	Nara = Andaman Fiddon	Philippines	Teak, Burma (Tectona grandis)	Burma, India
Cherry, African	Syria	Oak, African (Lophira alata)	W. Africa	Terekah (Pistacia terekah)	Syria
Cherry, American (Prunus serotina)	Domestic	Oak, American Red (Quercus rubra)	Domestic	Teuku (Callitriche quadrivalvis)	Morocco
Cherry, Australian (Excoecaria eucalyptifolia)	Domestic	Oak, American White (Quercus alba)	Domestic	Tiam, or Brown Mahogany	Burma, India
Cherry, English (Prunus Avium)	England	Oak, English, Brown (Quercus robur)	Domestic	Toon = India Mahogany	Burma, India
Cocobolo (Dalbergia retusa)	Central America	Oak, English, Pollard (Quercus robur)	England	Totara (Podocarpus totara)	New Zealand
Cotus Wood = Green Ebony	India	Oak, English, White (Quercus robur)	England	Tulip Tree (Liriodendron tulipifera)	Domestic
Cornuand Wood (Averia, cornuand)	India	Oak, Russian (Quercus robur)	Russia	Tulip Wood (Phaeolophyllum floribunda)	Brazil
Cypress (Cupressus sempervirens)	Domestic	Oak, Silky (Cedrela rubra)	Australia	Violetwood = King-wood	West Africa
Dagwood (Cordia florida)	Domestic	Okoumé (Aucoumea Klaineana)	W. Africa	Walnut, African = Lovoa	Domestic
Elony, Bombay	India	Olive (Olea europaea)	Europe	Walnut, American Black (Juglans nigra)	Domestic
Elony, Cape (Euclea Pseudelone)	S. Africa	Orientalwood (Eudaimon palmerstoni)	Queensland	Walnut, American White (Juglans alba)	Domestic
Elony, Grey (Diospyros cinnam)	India	Oron (Shorea gossii)	Philippines	Walnut, Curcassian	Russia
Elony, Macassar (Diospyros elegans)	E. India, Celebes	Palok, African (Pterocarpus rooseana)	W. Africa	Walnut, English	England
Elony, Red (Diospyros rubra)	Africa, Mauritius	Palok, Andaman (Pterocarpus rubra)	Andaman Isl.	Walnut, French	France
Elony, Texas (Diospyros texana)	Domestic	Palok, Burma (Pterocarpus macrocarpus)	Burma	Walnut, Italian	Italy
Erohe (African teak)	West Coast of Africa	Palo Rhuco (Tabebuia pentaphylla)	Mexico	Whitewood = Tulip Tree	Domestic
Ervo (Vicia papyphylla)	W. Africa	Parinari (Platanus insignis)	French Guiana	Yew, English (Taxus baccata)	England
Fraser (Terminalia rooseana)	W. Africa	Parinari (Pyrus communis)	Germany	Yew, New Zealand = Totara	New Zealand
Gondale Alva (Atrichium fraxinifolium)	Brazil	Parinari (Diospyros Virginiana)	Domestic	Zebano (Cymodactylus spp.)	West Africa
Greywood = Hardwood	England	Pine, Australian Red = Rima	Australia	Zebano (Cymodactylus guineensis)	South America
				Ziguan = Zeltano	West Africa

Table of various hardwoods used in decorative veneer inlay work and paneling on shipboard, together with country of origin.

powdered form can be sprayed successfully, chromium can also be included. The success of the metal spray as a preventive of corrosion is somewhat questionable, for experiments conducted with the following metals, sprayed to a thickness of 0.006 on a steel plate, showed sufficient porosity to permit moisture to come in contact with the steel: aluminum, tin, copper, monel, lead, nickel, brass, stainless steel, tobin bronze and aluminum bronze.

These test pieces were allowed to remain in salt spray for seven days, and all but the aluminum and lead showed a complete breakdown. After thirty days additional test in the salt spray, these two metals also broke down. When compared with galvanized specimens of approximately the same thickness, which lasted seventy-four days before breaking down, these tests did not show up very favorably. Feeling that perhaps these tests are not conclusive, further experiments are being made with the same metals sprayed to a thickness of 0.015, the results of which will be learned too late to be published in this paper.

It is difficult to obtain a perfect polished surface of brass sprayed on steel. Every experiment showed that the sprayed metal flaked when polished, causing very minute but noticeable imperfections. However, the metal-spraying process has been used with marked success in some marine work; namely, on the superheater tubes and other furnace parts of the steamship Bremen and steamship Europa; also for balancing of crankshafts, covering expanded ends of condenser tubes and tube sheets, feed water heaters, etc. Another

very interesting fact from a decorative viewpoint is that metal may be sprayed on such materials as fabrics, glass, and polished woods without any damaging effect to the base material.

Hardwoods

One of the most interesting applications of new materials in modern shipbuilding is the development of a wide range of varieties of ornamental woods for use as face veneers on joiner paneling and cabinet work. The accompanying list gives the principal foreign and domestic woods now available as face veneers for shipbuilding purposes, with their botanical names and geographical origin.

Considerable difficulty is experienced in attempting to give the botanical names for certain woods of tropical origin, due to the lack of standardization in the trade names used by different dealers, which often results in the same name being applied to the wood from two or more species or even families of trees. It also happens that, as the marketable supply of a certain wood becomes exhausted, other species of the same family, or other similar woods botanically unrelated to it, are brought forward by the dealer under the same trade name to fill the demand for the original wood, now no longer available. In this way, for example, the Brazilian wood known as kingwood has come to be derived from more than one source, the principal species used probably belonging to the granadilla and rosewood families. Similarly, since the species originally known as African mahogany soon became very scarce, it was replaced by another species of the same family,

and this in turn is now being replaced, under the same trade name, by new species of mahogany and other related maple-like woods.

It also happens that, for lack of definite information as to its botanical relationships, a new tropical wood is put on the market under the same trade name as some well-known wood of similar appearance, produced in some other part of the world and entirely unrelated botanically. In order to identify any of the new woods now available for face veneers it therefore becomes necessary to know their geographical source. For instance, Mexican mahogany and African mahogany are not even of the same family, and the so-called white mahogany is not mahogany at all but is of a different family, and is correctly known as *prima vera*. As an extreme case of this sort, zebrawood may belong to any one of four botanical families, depending on whether it is obtained from tropical Asia, Africa, Brazil, the West Indies, or the north coast of South America. Some common woods after receiving special treatment are found masquerading under a new name; for example, harewood is simply English sycamore maple, the principal timber maple of Europe, treated with a blue dye so as to produce a silvery-gray color which greatly enhances the beauty of the natural curly grain of the wood. Domestic woods of unpretentious origin are also marketed under a more high sounding title; thus satinwood, or false satinwood, if produced in the United States, may be either the common red gum or sweet gum, or else of the ordinary prickly ash family, and is so called because of a fancied resemblance to the much more expensive true satinwood of East Indian origin. On the other hand, English, French, Italian, and Circassian walnut are all produced from the same tree, the only distinction in their appearance being due to a difference in the growth of the species in various climates.

Some of these new veneers are marked by rare beauty of grain and coloring. Among others, bubinga has a deep red, ribbon grain, variegated with darker markings; while quarter-sawn African mahogany is extremely decorative with a high-lighted, rich brown grain, mottled with flakes of a darker shade. The so-called light Philippine mahogany has a strong ribbon grain in contrasting shades of light brownish yellow, and framire has a similar grain but less pronounced and of much paler yellow. Aodire also has a yellowish tint, but may be sawn so as to exhibit a beautiful rippling grain with strong high lights and shadows. The varied and striking coloration of these tropical woods also makes them especially suitable for inlaid ornamentation of the large flush veneered panels often seen in modern design.

Joiner Bulkheads

In a passenger ship the quantities of bulkhead ceiling materials used are enormous. Plywoods in thickness of seven-eighths and three-eighths of an inch, either with lumber or built up cores, constitute the usual construction. The woods used in the cores or laminations are chiefly fir, chestnut, or California pine; while veneers used for painted panels are ordinarily birch, poplar, or gum. Panels of this construction accomplish virtually everything for which they are intended; namely, they take a very nice paint finish, are semi-sound-proof, easily worked, and light in weight, non-conductors of heat, and are a very adaptable material for marine work except for the ease with which they burn. This deficiency has been recognized by manufacturers, and accordingly they have produced panels which, although not fireproof, are fire-resisting, such

panels usually being made up of wooden cores with veneers of sheet metal, asbestos composition, or other such materials. The new Export boats were recently so equipped, while the Morro Castle and the Florida have some of their spaces of this construction. Panels of this type give quite some trouble in erecting; special saws are required, holes have to be drilled for nails as well as screws, and, in fact, the erection costs are about 25 per cent. more than those for the ordinary variety of plywood panels.

In addition to these fire-resisting materials, there are the chemically impregnated woods, which in 2½-inch thickness can withstand a temperature as high as 1500 degrees Fahrenheit for a period of one hour before failing. It is claimed that woods so treated lose none of their physical qualities, such as tensile strength, that the increase in weight is about 20 per cent., and that they will take the same finish as untreated wood without any discoloration from the salts. Another usage of these woods is in refrigerating spaces, where dampness from accumulated condensation has to be contended with. They are now being tried out under such conditions, and while not conclusive, the latest reports indicate that they are standing up much better than the untreated woods.

The French Line has used a panel with a hollow core construction, made up of strips of hardwood about 5/32 of an inch thick and so milled that they keep together to form a series of squares, the sides of which are approximately 1¼ inches. Glue is applied to the surface of the strips and the completed three-ply or five-ply panel is superimposed by means of pressure. There is a small hole remaining in each of the strips for air circulation, which probably prevents the sinking of the faces of the panel into the hollows.

Although wood alone or in combination with other materials is by far the most common construction, there are also the metals. Aluminum has been used extensively in government work and will probably become a common material to the merchant ship in the future.

The construction of public space walls and ceilings is usually furring on steel bulkheads faced with hardwoods or fancy paneling. Now that we have stainless steel and welding, it seems a reasonable construction to omit the furring and paneling, and to replace the mild steel bulkheads with a decorative metal, thereby accomplishing a saving in space, a reduction in topside weights, and, above all, a fireproof construction.

Decorators claim that metals, no matter how they are finished, produce a cold appearance, which perhaps is correct; but after a big sea catastrophe from fire, the operator who is able to advertise the passenger quarters of his ship as fireproof will be more than compensated for placing safety ahead of catering to the whims of the critical public. Such progress as has been made in fire protection in the marine field may be largely attributed to the U. S. Steamboat Inspection and Safety of Life at Sea rules which govern the location and construction of bulkheads above the bulkhead deck, but when compared with the progress made by the building trades, particularly in the large cities, it seems as though our advancement is practically negligible. The attitude seems to be to equip to watch and fight fires rather than to protect against them. Whether or not this is the correct policy to pursue remains to be decided by those who operate the ships, but from the builder's viewpoint it seems as though it would be a worthwhile investment to make sea travel safer by fireproofing as far as possible the two most vulnerable spaces—passenger quarters and refrigerated spaces.

Safety

Promotion in the Marine Industry

By Robert F. Hand

Vice-President, Standard Shipping Company

SAFETY promotion has been carried on by the National Safety Council for a number of years and the excellent results attained are generally known. However, it is unreasonable to expect that a body such as this council can, by itself, carry on an effectual campaign to promote safety which will reach all of the individual workers without the absolute, concurrent effort of the whole range of the industrial organization, as this in the first place is primarily a function of industry. Promotion of safety is an administrative responsibility. As sales promotion is the tie between the advertising and the sales departments, so safety promotion should connect the administration and operating ends of the business. It should be the link which forges the chain of accident prevention. Unfortunately, at this time, not all companies in the marine field are giving this phase of their business the serious consideration it deserves. In fact, many shipping firms are still doing nothing save "wink" at this noble work.

Every executive head, inclusive of masters and subordinate officers, must be in sympathy with a safety campaign. Any who are not whole-heartedly in accord with the principle of modern accident prevention work must be convinced that there are decisive benefits to be derived and must be shown that his sincere support is required if lasting, successful results are to be secured.

It was the nonchalant attitude toward Safety Promotion that created demands for workmen's compensation laws in the United States and other types of social legislation in foreign countries. Workers became enlightened; they refused any longer to be trod upon, and the result is the improved conditions of today. Why should the vast number of men employed in marine and semimarine pursuits nowadays be handled differently? They are all human.

The introduction of the campaign system enlists the cooperation of the workers in offering suggestions for mutual good; it provides a method of supervision whereby the executive, ignorant perhaps of certain practices, may be furnished reliable data concerning weak spots.

The repetitive principle of advertising should be applied to safety as well as to commodities. In connection with safety, however, it is more difficult to apply at the outset. One would never conceive of a manufacturer of any patented article plunging into an expensive publicity campaign while he, himself, remained "unsold" on the merits of his commodity! Yet I have run across several cases of executives approving the inauguration of a systematic, concerted attempt to eliminate personnel accidents and inwardly ridiculing many aspects of the campaign which are recognized by experts to be fundamental. Sometimes it takes years to "debunk" such a man; and until his false conception of accident

prevention is eradicated from his mind, it is a waste of time, energy, and money to try to "sell" safety to him. This attitude is generally reflected among subordinates all the way down the ladder; with the result that accident frequency and accident severity rates do not show the percentage of improvement desired; operating costs are increased due to the expenditures associated with the campaign; the management becomes discouraged; and the "traditional policy-holder" executive is more than ever erroneously convinced that he is right.

Direct Promotion

The first move in Safety Promotion is to convince the operating manager of the advantages of safety education and practices, get him behind the project body and soul, and you will begin to reap the reward of a lower frequency rate and a lower severity rate. All of this will mean reduced outlay for compensation, medical and sundry expenses, and will be reflected eventually in decreased insurance rates. The difference may be added to the employer's profits.

The operating manager of an American fleet being thoroughly sold on Safety, I would suggest that he set up the following measures as a program of Direct Safety Promotion:

- (a) As supervisor of all safety work, a safety specialist reporting to the operating manager.
- (b) Formulation of a general safety campaign by a central safety committee.
- (c) Set up of subordinate committees on all ships of the fleet or individual units.
- (d) Ships to be kept continuously supplied with new safety posters and appropriate literature.
- (e) Safety contests.
- (f) Safety practice rules.

To my mind, it is highly important to have one man who is safety-conscious in every respect and who has had a good theoretical as well as practical experience in the marine field concentrate on the accident prevention work of the organization. This man should supervise the fulfillment of all the approvable suggestions and recommendations from the central safety committee.

This main committee should be responsible for formulating a vigorous safety campaign; and, in order to accomplish this, subordinate committees should be organized to handle the individual units of the organization.

Suitable safety posters, attractive literature, and other media are obtainable from the National Safety Council as well as from other sources, and these should be supplied anew from time to time to these units, so that interest at no time will be allowed to wane.

All communications from the subordinate committees should be given prompt and serious consideration by the central committee. The subordinate committees

are entitled to be heard and to have their suggestions considered.

Safety contests are good because they stir up competition. If one unit presents an enviable record, the other units will "sit up and take notice."

Safe practice rules are always preferable to regulation because they show the right way and still give leeway.

Indirect Safety Promotion

In addition to this direct campaign, safety can be promoted indirectly by having better trained employees. This can be accomplished by reducing the turnover figures. There are many ways of retaining marine employees for long periods. The main thing is to keep the man contented at his work by offering him rewards for long, continuous service, such as accident and sickness benefits, death benefits, vacation with pay, continuous service bonus, efficiency bonus, library service, comfortable quarters, and, above all, a good mess. It is after all a true saying that the way to a man's heart is through his stomach.

These are all plans that can be carried out in any organization, but the vital thing to be accomplished is to strike a human interest and "reason why" appeal to the individual group, and this is something that has to be worked out by each company according to its own situation.

To illustrate my point on this, I should like to cite the method employed by an oil company in Venezuela. Most of its peon laborers in the field are illiterate workmen, and in endeavoring to carry the safety message to these men the company's management took into consideration the fact that, although very few of them can read, most of them are interested in all sorts of handbills and advertisements. In this company's first experiment it was found that those who could not read preserved the material carefully until they found a companion who could read it to them. The company played on this propensity of its employees by inserting safety literature in pay envelopes and the results were gratifying.

Another trait of these peon laborers is an inherent desire to participate in lotteries. The management therefore devised the plan of offering safety rewards in a substantial sum, giving each employee a chance to win this sum by lottery. The only requisite for obtaining a ticket was the requirement that they work a certain number of days without an accident. There are a thousand and one different plans of a similar nature which can be worked up by the individual companies to attain the same end.

The Standard Shipping Company has adopted much of the program just outlined. Some three years ago they organized a Port Safety Committee as well as a safety committee on each of the ships, at the Bayonne Storehouse, at Baltimore, and several other United States ports where many of their ships call. Results have been produced by these committees which fully justify their continuance. Ships' committees hold meetings twice a month. At these meetings the officers review every accident, no matter how trivial. Each case is gone over carefully and suggestions are offered to prevent recurrences. In addition to this, other suggestions are offered to improve working conditions and eliminate hazards. Once a month the Port Safety Committee meets and reviews the minutes of each ship, carefully considering the recommendations of each ship's committee, and is extremely careful to answer each one in detail, thereby impressing on the various subordinate committees that their suggestions are be-

ing given serious consideration. In this way a great many improvements are made and practices adopted which we feel are responsible for the prevention of accidents. In addition to this, we never fail to have an article on safety in our monthly *Ships' Bulletin*, each one different, however, to avoid monotony. We also run a "No Accident Month" campaign along with our participation in the National Safety Council Petroleum Section's Safety contest.

We have a Plan for Annuities and Benefits whereby wages are paid during disability due to sickness for specified periods according to the length of service, and an annuity upon retirement; a plan for death benefits for varying amounts dependent upon length of service; vacation with pay; and a plan whereby employees may acquire common stock of the company at an advantageous price. We also pay very careful attention to keeping our men well fed, being very particular in the selection and training of men for our steward's department.

These are the high lights of safety promotion. Any one seriously following the general trend by adopting at least some of the direct as well as indirect measures can be almost guaranteed success in the endeavor to lower his accident frequency rate.

Abstracted from "Safety" by the National Safety Council

Improvements in Lighthouse Service

INCREASING use of automatic apparatus, making possible the establishment of a considerable number of new lights at comparatively small cost, and a general tendency toward more efficient aids to navigation of all kinds are indicated in the annual report of the Commissioner of Lighthouses, George R. Putnam to the Secretary of Commerce. Twelve new radio-beacons have been installed during the past fiscal year. Two major lighthouses were under construction and plans were made for the immediate rebuilding of an important lighthouse in Alaska, threatened by the crumbling of the cliff upon which it was built.

A new aid to navigation, introduced during the past few months, is the synchronization of air fog signals and radiobeacon signals for distance finding purposes. A vessel navigating in a fog and hearing a fog signal or picking up the radio-beacon signal of a single station is unable to determine its distance from the sending station, although the direction may be definitely known. By arranging that both kinds of signals be emitted in a certain sequence, distance finding is possible, based on the fact that sound in air travels at a known rate of speed.

During the fiscal year three new lightships were completed and placed on station. One of these went to Frying Pan Shoals, North Carolina, one to Fenwick Island, Delaware, and another to Nantucket Shoals, off the coast of Massachusetts.

Total number of aids to marine navigation at the close of the fiscal year 1930 was 20,273, an increase over the previous year of 711. Appropriations for the maintenance of the Lighthouse Service totaled \$10,090,075 for the fiscal year, and for special works \$1,424,000. This money was expended for the maintenance of navigational aids in twenty-one states having ocean coastlines, in eight bordering the Great Lakes, and an additional six states bordering upon important navigable rivers. The allotment made by the Aeronautics Branch of the Department of Commerce for the prosecution of airways activities amounted to \$7,785,600.

- 2 cargo compartments with wall coils.
- 4 Cargo compartments with cold air system unflow.
- 10 ship's service compartments.
- 32 brine circuits.

In the column reserved for "Remarks" there should appear a record of all changes, adjustments, repairs, stores, and the name or initials of the refrigerating engineer on watch. Such a form, if faithfully used, should give a complete history of the plant. The readings are made every four hours, the first column showing these hours, the P.M. time in heavy type, the A.M. time in light face type. To assist in the accurate tabulation and reading of the log, heavy ruling is indicated at regular intervals vertically and horizontally.

[The End]

Load-line legislation to cover vessels in coastwise traffic and on the Great Lakes was before the last Congress, but was not acted on. A load-line law for such craft seems desirable for the protection of life and property. Such a law would also relieve the careful, conservative operator from the unfair competition of the small minority of owners who may be tempted to give more weight to the possible profit of the voyage than to the safety of the crew.

The amendment of present steamship inspection laws to cover motor craft is recommended. There are in the country today more than 12,000 documented motor vessels of which 143 are of 1000 tons or more and 250,000 American-owned undocumented motor vessels. While it would not be feasible to extend inspection to all small motor boats, it is believed that in the interest of safety, seagoing vessels of 100 gross tons and over should be subject to inspection laws.

During the last fiscal year, 7000 violations of the navigation laws occurred, of which 2600 were discovered by the five patrol boats of the Bureau of Navigation service. That ships' masters generally comply with regulations is indicated by the fact that these boats made 27,000 inspections during the year reviewed.

Statistics in connection with the United States merchant marine show that during the last fiscal year 1302 vessels of 386,906 gross tons were built and documented, and on July 1, 1931, there were building or under contract to build in our shipyards for private shipowners 105 vessels of 358,904 gross tons. The corresponding figures for 1930 were 1020 vessels of 254,296 gross tons built and 291 vessels of 486,602 gross tons under contract to build. With the volume of world's merchant shipbuilding smaller than at any time in the past four years, Commissioner Tyrer declares that "American shipbuilding has risen to a new high record for post war construction and, with the exception of the war period, it is the greatest in history."

American Navigation in 1931

Provisions of the American load-line act of 1929



Marine Equipment

NEW OIL BURNER ~ MANILA ROPE BEST
NICKEL CAST IRON ~ ELECTRIC TRUCK ECONOMIES

Todd Semi-Automatic High-Low Flame Oil Burner for Marine Boilers

ON nine new motor tankers under construction in Europe for the Standard Shipping Company the auxiliaries will be operated by steam, generated in exhaust gas boilers.

For fire extinguishing purposes in the machinery space CO_2 will be utilized, but in all other parts of the ship steam will be relied upon, and in order that a considerable volume of steam will be available at all times, the exhaust gas boilers will be connected to the donkey boilers, which latter will act as steam receivers. Even with this precaution, the supply of steam in case of fire will be quickly consumed, particularly if, as is probable, the main motors are slowed down or stopped, and consequently independent means must be provided for generating steam under such conditions.

This of course means that a scheme must be devised whereby the fires under the donkey boilers are automatically lighted when the steam pressure drops below a predetermined limit, and as no reliable system of this type—in which certain hazards were not present—was available, the Todd Engineering Company has developed an oil burner named Todd Semi-Automatic High-Low Flame Burner, which is reliable and safe and, with one exception, utilizes for its component parts nothing but standard well-tried equipment.

As any automatic fuel oil burner relying upon an electric spark to light the fire is more or less complicated and embodies certain elements of danger and unreliability, the owners decided to use a burner which was constantly lighted. For

economic reasons the owners demanded that this burner, when operated under "no load" conditions, must use a minimum quantity of fuel but be so constructed that upon demand it could instantly atomize equally as large a quantity of fuel as the standard burner. After repeated experiments, it was found impractical to make such a burner, and a double burner arrangement was therefore resorted to.

This burner consists of a standard Todd burner under which, as an integral part, is located a similar burner, called the "pilot", the two being exactly alike insofar as construction is concerned except for size. Inasmuch as this pilot burner is in operation at all times, and due to its small size can be operated satisfactorily only on light grade fuel, it was necessary, in order to minimize the cost of operation (though it uses less than 0.75 barrel of fuel per day) that it be piped up independent of the main burner and operated by its own fuel pump. This pilot burner operates under natural draft conditions, but the main burner, of course, operates under forced draft; and, in order that the necessary air will be immediately available when the main burner is lighted, the main fuel pump and the forced draft blower are driven by the same electric motor.

The operation of the automatic feature is simplicity itself. A standard, electrically operated, automatic high-low pressure valve is installed in some suitable location in the steam line, preferably near the steam gauge. This unit is set to the required minimum and maximum pressures, the electrical end being connected to the ship's circuit, and

through a relay switch to the combined main fuel oil pump and blower; this relay switch is necessary, as the pressure valve does not have capacity enough to handle the amount of current required by the main fuel pump.

When the steam pressure drops below a predetermined point the pressure valve automatically connects the switch supplying the current necessary to operate the fuel pump, and the pilot burner ignites the main burner as soon as the fuel pump starts. Similarly, when the steam has reached the required maximum pressure, the valve automatically disconnects the switch, the pump stops, and the main burner is shut down.

It is obvious that failure of the pilot burner to stay lit would result in the main fuel pump pumping raw fuel into the furnace and, when a fireman subsequently endeavored to light the burner with his torch, an explosion might occur. To safeguard against this condition, an electrically operated stop valve is placed in the main burner fuel line. As long as the current is supplied to this valve it remains open, but when current is shut off, the pressure of the fuel itself automatically closes the valve. Control of this valve is accomplished by an ingenious device, called a Protectoglow.

The main part of the Protectoglow consists of a Gridglow tube filled with Neon gas, which tube might be called an electric valve capable of operating with an exceedingly small electric current. The Gridglow tube is about the size of an ordinary radio tube. Anode and grid consist of small parallel rods near the center of the tube; the

cathode is a fairly large hollow cylinder, surrounding these electrodes. Due to high resistance, the electric current cannot flow between the cathode and the anode, and consequently the tube does not light, but by "grounding" the grid sufficient electric current to light the tube is permitted to pass from cathode to anode. This tube has no film, and as it is mechanically strong it has a very long life.

One end of an electrode, consisting of high temperature alloy, is connected to the cathode and grid of the tube, the other end being projected into the flame from the pilot burner. This flame becomes a "conductor," making the necessary "ground" referred to above, permitting current to flow through the tube—lighting it. Consequently, while the flame is burning the Gridglow tube is functioning, and through a suitable relay passes the current to the electrically operated stop valve in the fuel oil line, holding this valve open. Obviously, if the flame for any reason goes out, the Gridglow tube being no longer grounded, fails to function, and the electrically operated stop valve is automatically closed. As the Gridglow tube is neither heat sensitive nor tight sensitive, it cannot be affected by any outside influence, and the possibility of admitting raw oil into the furnace is therefore eliminated.

The only parts of the Protectoglow subject to deterioration are the Gridglow tube and the electrode, and when you consider that the Gridglow tube has a serviceable life of more than 15,000 hours, the replacement of this unit will not have to be made very often, unless it becomes damaged by rough handling. In any case, failure of the tube would merely result in the fuel oil system shutting down, and replacement is a simple matter inasmuch as the tube is equipped with a standard radio tube base. The electrode being composed of a heat and corrosion resisting alloy, will not soften or deteriorate very rapidly and should last for many years; should unusual conditions affect the life of the electrode, replacement is easily accomplished without the aid of tools, as the electrode simply slips into a spring socket.

When the system is in operation, a red warning light or electric bell, or both, will be fitted to the working platform or in other suitable location, and this will function

warning the engineer in case of flame failure. Thus a minimum amount of supervision is required, a very important factor on a tanker where only two men are on watch in the engine room during the night hours.

As the various valves are automatically closed when there is no flame present in the furnace, a push button is fitted on the Protectoglow unit, so that by pressing this button the current is short circuited, permitting the Gridglow tube to function, and the fires can

then be manually lighted. The entire system thus operates to provide an automatic oil-burning system, requiring no supervision within the limits of mechanical and electrical fallability, and so arranged that should failure take place warning is immediately given that such failure has occurred. In addition and perhaps most important of all, necessary steps have been taken to prevent such failure from developing into a hazard, thus eliminating the greatest of all sources of danger, the human element.

Lift-Truck Economies

AN Elwell-Parker fork-type lift truck, recently acquired by a Pacific Coast stevedoring firm, is demonstrating the economies in materials handling made possible

through the intelligent application of modern mechanical methods.

As shown in the illustrations, this truck picks up loads on skid platforms, transports these loads to any point necessary, and tiers the load in the pile or deposits it on truck or car or on pier alongside the ship.

In the rehandling of green hides, it has been found especially useful and economical. This operation (as anyone knows who has ever had intimate contact with green hides) is a very disagreeable job for manual handling. With the lift truck it becomes easy. The hides are now stacked on boards at the car. The truck picks up the boards and carries them to the pile. When ready to load ship, the truck picks the board-loads of hides off the pile and loads them on trains of four-wheelers which are hauled to the ship side, where the boardloads of hides are picked up by ship's tackle.

This method of using the Elwell-Parker fork-type lift truck saves over twenty dollars a day as compared with hand trucks in handling green hides.

This machine will handle loads up to two tons from truck bodies to the dock, or vice versa. Heavy barrels which formerly were laboriously rolled by hand up inclines to truck platforms are now easily handled in multiple.

This particular machine has proved that kept busy it will cut the costs of manual operation sufficiently to pay for itself twice each year. Such savings for terminal operators are certainly worth investigating.

Ira G. Perin of San Francisco is California representative for the Elwell-Parker Electric Company.



Elwell-Parker fork-type lift-truck handling skid-loads at a Pacific Coast terminal.

Nickel Cast Iron in Diesel Engines

CAST iron has always been the basic material involved in diesel engine construction and there seems little reason to fear it will be supplanted unless some revolutionary change occurs in the industry. No other metal possesses quite the same combinations of economic and engineering qualities as cast iron, and while the early development of its physical properties may have been neglected, if comparison be made with other metals, later research work has clearly indicated that cast iron can be sufficiently improved by the use of alloys to enable it to meet every reasonable requirement.

The present widespread use of nickel cast iron in diesel engine construction is largely due to the increasingly severe service placed on such vital parts as cylinder heads, cylinder liners (a. separate, b. intercooled with housing), and pistons and piston rings, as well as the same parts of the air compressors. These parts are subjected to the effects of high temperatures and high pressures, to resist which certain specific properties in cast iron are required. These properties are: (1) strength at elevated temperatures, (2) elimination of porosity, (3) maximum resistance to wear, (4) minimum growth due to repeated heating.

The temperatures of certain portions of a diesel engine are appreciably elevated under working conditions, in spite of the fact that these parts are cooled. Temperatures varying from room temperature to 630 degrees Fahrenheit are regularly encountered. It is also important to note that there are occasional disarrangements of cooling systems. A clogged passage may result in augmented temperatures, and some parts may quickly reach 900 or 1000 degrees Fahrenheit. Uneven distribution of temperature, of course, implies that there will be stresses in the metal which must be taken into consideration.

Varying conditions are also experienced with pressures. The customary maximum working pressure in the working cylinders of a diesel engine is approximately 600 pounds per square inch, but here again accidents may happen and the pressure may be raised to 750 pounds per square inch. Where air compressors are used in conjunction

with diesel engines, the working pressure in the high pressure cylinder is generally about 1000 pounds per square inch for spray air injections and about 2500 pounds per square inch for charging air starting flasks. These conditions make the use of a material possessing high tensile strength a primary requisite. No less important is it to see that all castings used for working cylinders and air compressor cylinders are absolutely free from porosity.

That nickel permits an increase in the strength of gray iron has been fully proved in transverse, tension, and compression tests. The increases due to the simple addition of from $\frac{1}{2}$ per cent. to 5 per cent. nickel vary from 10 per cent. to 50 per cent., depending upon the composition of the iron and other factors. Much greater strength values are possible if nickel be used in accordance with the latest technique, given iron of suitable composition. Tensile strengths of 40,000 to 50,000 pounds per square inch may be obtained with the proper amount of alloy, suited to the particular base composition used and the section of the casting. These increases, it is important to note, are obtainable in readily machinable castings.

The question of machinability is very important to both the manufacturer and user of diesel engines. Close tolerances in machining in large part explain the high initial cost of these prime movers, and the use of an alloy capable of giving better properties only at the price of increasing the difficulty of machining would automatically prevent its employment. Happily, nickel has been found to be free from any such drawback. In fact, in certain foundries nickel is primarily used to reduce machining costs, for it enables the foundryman to develop the full hardness of the matrix of the iron without the formation of carbide spots and areas, the real cause of machining difficulties.

The equalizing effect of nickel is particularly valuable in the case of castings having both light and heavy sections that require machining, to formulate a mixture for which is an ever-recurring problem. Lowering silicon to harden the heavy section normally results in

the light section becoming hard and unmachinable, while raising silicon to render the light section machinable results in the heavy section becoming too soft and open in grain.

The latter leads us at once to the defect of porosity which must be avoided in all pressure castings. The production of absolutely sound castings, free from porosity and internal shrinkage, is perhaps the most generally useful result secured by the addition of nickel. The use of a correct base mixture and small additions of nickel, or of nickel and chromium, refine and close the grain of iron castings and act to reduce porosity due to open grain and loose texture. Perhaps the commonest method to eliminate internal shrinkage used by alloy iron producers is to reduce the silicon content by the use of from 40 to 60 per cent. of steel in the charge, and to add a compensating amount of nickel, generally twice the amount of the silicon reduction.

The use of nickel in the production of dense, machinable castings also results in the obtaining of increased wear-resistance. This increase is primarily due to the additional hardness secured, but credit must also be given to the finer structure of nickel iron castings and to their freedom from hard and brittle iron-carbide particles. These hard particles become dislodged by friction and act as an abrasive to score and wear the sliding surfaces. Cast iron that has been hardened up to 200-250 Brinell by the addition of nickel is relatively free from these particles, takes a high polish in service, and offers a much greater resistance to wear than the softer and less uniform product.

Cast iron in diesel service is subject to the danger of growth caused by repeated heating. Such growth is quite marked in ordinary cast iron at approximately 900 degrees Fahrenheit, whereas the temperature required to produce equal growth in nickel-chromium cast iron is in general about 1000 degrees Fahrenheit. Thus, while only some abnormal condition brings this factor into consideration, the use of nickel-chromium cast iron affords an additional factor of safety which may be of the utmost importance in certain eventualities.

[Nickel Cast Iron News]

A Complete Sales and Service Organization

Of interest to the marine trade on the Pacific Coast is the announcement that King-Knight Company of San Francisco is to represent the Kinney Mfg. Co. of Boston for northern California, Oregon, and Washington.

King-Knight Company has been associated for many years with the marine and oil industries. Many Pacific Coast oil barges are equipped with pumps and engines furnished through this organization. The acquisition of the line of oil pumps manufactured by Kinney, undoubtedly the best known manufacturer of this type of pump, puts the King-Knight Company in a position to furnish the highest type of equipment and enables it to fulfill all possible pumping requirements where a positive displacement type of pump is desired—whether steam, gas engine, or motor driven.

The Kinney pump is built in a large range of sizes and is of two types; namely, the eccentric plunger type and the Heliquad type. Many hundreds of both types are now in service on the Pacific Coast, at sea and on shore, both in the loading of ships and at refineries and in the oil fields. Compactness of mechanical design, extreme simplicity of construction, high efficiency, and long life as compared to other pumping equipment have made the Kinney pump pre-eminent in its field. This pump has been used with the greatest satisfaction for pumping duties under difficult and unusual conditions where pumps of ordinary construction are said to have proved unequal to the demands.

The Kinney steam-jacketed pump satisfactorily handles tar, asphalt, or similar products which cannot be economically pumped unless the pump itself can be thoroughly heated. In the Kinney steam-jacketed pump the interior working parts are thoroughly heated by circulating steam, which absolutely prevents any possibility of the fluid becoming solidified or hardened in the pump interior, and also, under all weather conditions, provides for the prompt heating and starting of a pump which had been shut down when filled with a fluid which solidifies on becoming cold. The Kin-



Remi C. Knight.

ney steam-jacketed pump is also used for coconut oil and other viscous materials and is built in both rotating plunger and Heliquad types.

There has also been a wide demand for the Kinney vacuum pump; and the Kinney Manufacturing Company has issued a special bulletin covering pumps for this field. The standard Kinney vacuum pump is built in displacements of from 12 to 780 cubic feet per minute and is designed for use under normal operating conditions in vacuums up to 29½ inches of mercury and under special conditions up to 5 millimeters absolute pressure.

With the Romec rotating-vane positive-displacement type of pump for low pressure work and the complete line of Kinney pumps for fulfilling all requirements in the

fields of high pressures and high temperatures, the King-Knight Company is in a position to fulfill the requirements for all pumps throughout the entire field where a positive displacement type of pump is required.

D. J. Hill, representative for Kinney Mfg. Co. in Los Angeles, will continue in this capacity and will cooperate with King-Knight Company in handling Pacific Coast business.

King-Knight Company represents also: Skinner Engine Company's Universal Uniflow steam engines; Sterling Engine Company's heavy duty gas engine up to 560 horsepower; Electric Boat Company's Nelseco diesels; Superior Engine Company's diesels from 65 horsepower up; Hill diesel engine from 10 to 120 horsepower. This range of engines enables the company to meet all requirements in the power field.

The two members of the firm—King and Knight—have both had interesting careers.

Knight was graduated from University of California in Electrical Engineering 1915; was with Pacific Gas & Electric Co. until the World War; joined the Army; trained at Camp Lewis; became second lieutenant of Engineers, first lieutenant Engineers, regulars; served with the famous Fourth Engineers; was wounded at Chateau-Thierry; invalided home. He retired from the Army Engineers in 1919 after two years in hospital.

King was graduated in Mechanical Engineering, Stanford, 1912; engineering degree 1913; visited Germany with The A.S.M.E.; served eighteen months testing at General Electric factories, Schenectady, Lynn, and Pittsfield; two years sales engineer at San Francisco office, March, 1917. King joined U. S. Navy; trained at Annapolis; served with destroyers Monahan, Irish and North Sea Patrol; Isabel and Ammen on convoy duty, Brest. Resigned as senior lieutenant in 1919; he returned to the General Electric Company's San Francisco office, where he remained until the King Knight Company was formed in 1920.



Lyman S. King.

Pumps on New York Fireboat

THE New York City fireboat John J. Harvey is equipped with four high-pressure Lecourtenay fire pumps, each of which is driven at 1200 revolutions per minute by a Sterling Viking II gasoline engine through a Cutler-Hammer magnetic clutch. These pumps were specified for a normal capacity of 4000 gallons per minute each against 150 pounds per square inch pressure, or a total for the boat of 16,000 gallons per minute, which was slightly exceeded on the official test.

The pumps are located below the water line of the boat so as to be self priming. On account of this requirement together with the large piping and many valves required to permit operating any combination of two pumps in series, the equipment was necessarily crowded, and the Lecourtenay Company had to work in careful conjunction with the designers of the vessel in designing a special centrifugal pump casing for this service. In spite of all this crowding the pump case can be readily opened without disturbing any piping. The case is split at a 45-degree angle with the suction opening horizontal and the discharge vertical.

Each unit was thoroughly tested in the Lecourtenay test plant under



One of the four Lecourtenay fire pumps on the fireboat John J. Harvey.

the rated capacity and pressure before shipment, this test being witnessed and approved by the engineers.

These tests show remarkable uniformity in results for the four pumps. Efficiency at rated capacity is 79 per cent.

The application of Farrel-Sykes gears to large capacity pumps has recently become general. The gears shown in the illustration run at 435 revolutions per minute and pump 625 gallons per minute against a head of 200 pounds. A pump of this kind makes a simple and efficient installation. It is very small for its capacity, no reduction gears are required, and it is consequently economical to manufacture.

Farrel-Sykes pump rotors are made in a variety of material, including bronze, high carbon forged steel, nickel-alloy cast iron, and various alloy steels including Nitralloy. The gears made in this last named material are of great advantage.

Farrel-Sykes pump rotors are made exceedingly accurate; they have no backlash and no bottom clearance. The shape of the tooth is designed to reduce trapping of the liquid to a minimum, and to eliminate hydraulic noises.

Trade Literature

Convertible Multivane Fans, Catalog 370, by B. F. Sturtevant Company, Hyde Park, Boston, made up almost entirely of photographs, diagrams, and tables to describe and illustrate the special features embodied in the construction and design of this fan for various installations.

Nickel Alloy Steel Products—1932 Buyers Guide—is ready for distribution by the International Nickel Company, Inc., 67 Wall Street, New York. Guide contains names and addresses of manufacturers and foundries producing nickel alloy steel parts and machines. Copies may be had by applying to the company or to the Editorial Department of Pacific Marine Review.

Herringbone Pinions for Pump Engines

FARREL-SYKES herringbone gears have a world wide reputation for use in the transmission of power. They have, however, other applications which are not so well known.

The illustration shows a pair of pinions used as impellers, sometimes called cams and rotors, for the gear type of pump. Farrel-Sykes gears are used in thousands for this purpose. Many of the best known pump makers use them as standard. They have numerous advantages for this purpose. Pumps made with these gears are more efficient mechanically and volumetrically. They can run at a very high speed. The smaller size pumps are used with motors direct-connected to them, running up to 1800 revolutions per minute. Such pumps are often used

for high pressures; 1000 pounds per square inch is standard with some makers using Farrel-Sykes gears, and in some special cases the gears are used for pressures up to 1500 pounds per square inch.

Two Farrel-Sykes pinions used as impellers for a rotary pump.



Mackay Radio Aboard Ship

IT has recently been announced by H. E. Coyle, Pacific Coast Marine Superintendent for the Mackay Radio and Telegraph Company that the new United States Lines express liners Manhattan and her sister, two largest merchant vessels built in an American shipyard, are to be equipped with a Kolster radio compass and Mackay radio sending and receiving equipment for two lifeboats on each ship. New regulations of the United States Steamboat Inspection Service require that all vessels carrying nineteen or more lifeboats shall have two of them equipped with suitable power for propulsion and with radio sending and receiving apparatus.

The lifeboat radio transmitter, as designed and developed by engineers of the International Communications Laboratories, is a small vacuum tube transmitter operated on a frequency of 500 kilocycles and takes its operating current from a 12 volt storage battery which is charged by the propulsion power unit of the boat. The receiver is a compact, light weight set operating on wave lengths of 500 to 1000 meters. The collapsible antenna stowed in the boat is put up after the boat



Steam yacht Stranger, owned by Fred E. Lewis, is equipped with Mackay radio short and intermediate wave wireless, giving ocean-wide communication range.

is launched.

The Kolster radio compass (direction finder) is already serving more than 400 ocean-going ships, including ten out of the eleven United States Lines' vessels. The model being installed on the Manhattan and her sister is known as A.M.-4490C and is the largest made. The radio compass is now considered practically indispensable on fast modern merchant vessels and should be so considered for all vessels. It is an accurate, scientific instrument for navigating purposes and the most satisfactory device evolved to date for safe navigation in fog.

draulic operating cylinder, 6 feet 8 $\frac{1}{4}$ inches high and 3 feet 9 inches inside diameter, with its interior surface ground to insure accuracy of finish. This cylinder has a pipe connection at the top and also at the bottom for the purpose of admitting water above or below the piston and thus closing or opening the valve. The piston has a dished section and is fitted with four packing rings of special design. It is specified that, with all four rings bearing, a force of not over 2000 pounds will be required to traverse the piston in the cylinder.

A tail rod extends above the pis-

Two Huge Gate Valves

RECENTLY a group of large bronze castings were manufactured by the Cramp Brass and Iron Foundries Company for the Board of Water Supply of the City of New York. Included among them were the parts necessary for the construction of two 66-inch gate valves, which are of extraordinary size and unusual design. Not the least interesting fact in connection with these valves is that they will be placed about 550 feet beneath the surface of the ground. Our illustration shows one of the completed valves, standing about 30 feet in height and weighing over 50 tons.

These valves were built throughout to most exacting specifications prepared by the Board of Water Supply. The manganese bronze used in the main pieces of the valves has a tensile strength of more than 70,000 pounds per square inch. The workmanship is of the highest class throughout, accuracy of construc-

tion being essential in order that the required tests for leakage and ease of operation may be met.

The bottom piece of the assembly shown in the illustration is the valve body — a casting weighing, finished, 23,800 pounds. The openings leading into the body are 66 inches in diameter. The gate, or plug, is tapered, 10 inches wide at the bottom and 18 $\frac{1}{4}$ inches wide at the top, accurately machined in its bearing faces, and fitting, when closed, against machined surfaces in the body. The gate is raised and lowered by a stem 7 $\frac{1}{4}$ inches in diameter. This stem is of manganese bronze forged, having a tensile strength of 80,000 pounds per square inch, and is ground to assure accuracy. Mounted on top of the valve body and securely bolted to it is a dome, providing space in which the gate may rise when the valve is opened. The dome, including its cover, is 3 feet 7 inches high. Surmounting the dome is the hy-



One of the two 66-inch bronze gate valves built by Cramp Brass & Iron Foundries for the City of New York.

ton, and on top of the cylinder is mounted a housing, or stanchion, which serves as a guide and also supports the operating mechanism. The stanchion supports two hold-open cylinders, which are hydraulically operated and control a mechanism for holding the gate in a raised position, thus preventing the valve from closing should the pressure in the main cylinder fail. A controlling chain extends from the top of the stanchion 500 feet to the surface.

These huge valves were subjected to very exacting hydraulic tests. After assembling, with the gate out of seating, all joints had to be absolutely tight for a period of 30 minutes under a pressure of 400 pounds per square inch. The hydraulic cylinder was subjected to a pressure of 750 pounds for the same length of time, and the hold-open cylinders to a pressure of 300 pounds. The maximum amount of leakage past the piston rings and stuffing boxes was also specified.

Manila Rope Best Aboard Ship

ENTERING into the choice of various products, especially those which see constant use, the long lasting or wearing quality is probably the factor which proves most important in deciding which to purchase. In the case of rope, that made of Manila fiber is considered far superior to other varieties for marine purposes, construction work, farm use, and general requirements because of its high tensile strength, longer wearing qualities, and greater resistance to deterioration from the elements. The service received from one make of Manila rope may differ materially from that of another, however. Though the general appearance in both cases may be the same, the results depend largely upon the lubrication, manner of treatment, construction of the rope, and the processes of manufacture.

The Edwin H. Fittler Co. of Philadelphia, oldest rope maker in the United States, has been manufacturing Manila rope since 1817, and during that time its products have been considered generally among the trade as the standard of quality. Fittler rope is scientifically treated by them with a colorless water-repellent compound of the highest quality, the fibers receiving the treatment before being spun into yarns which gives a much more thorough water-proofing than if the yarns were put through a dipping process. For marine work, where it is the rule rather than the exception for rope to be wet, this treatment is especially valuable. They also make a Sea-Treated Manila rope, especially treated with a dark brown water-repellent and preservative compound, the result of many years of research work, and this type of rope is desired by many for use in sea water or salt air.

However, no matter what the quality of the rope may be, or what treatment was given it in the making, proper precautions must be taken to preserve the rope after it is put into use—or the best rope will deteriorate more quickly than it should. Dirty cordage should be washed and thoroughly dried before storing. All Manila cordage should be stored in a cool, dry, and well ventilated room. It should be kept up off the floor on racks to provide ventilation underneath.

Rope should never be stored on concrete or dirt floors, and under no circumstances should Manila cordage and acid be kept in the same building. If the warehouse or storage building is covered with galvanized iron, allow ample space above the cordage for air circulation.

Rope, as treated with Fittler's water repellent compounds, are more pliable and less liable to kink—but a little advice on the handling of rope will not be out of the way, and if heeded, will prove beneficial to the user in longer life and use of the rope. To avoid kinking, lay the coil down flat with (inside) end down and draw end of rope up through the center of the coil. Plain laid, 3-strand rope uncoils counter-clockwise. Cable laid and left-hand-lay uncoils clockwise. Avoid dragging rope over concrete floors or through dirt and oil, as this causes injury to the rope and shortens its life. Never allow rope to rub on rough surfaces of beams or blocks. Kinking should be avoided as it disturbs the "lay" of the rope, reduces the strength, and may eventually cut the rope in two.

The Aut-O-Bee

A DEVICE has come from the laboratory and workshop of the Motor Car Devices Co. of Los Angeles that has many indications of revolutionizing the installation and operation of radio receiving sets in motor boats, airplanes, and automobiles, as well as on farms and other places where electric current is not available.

Under the registered name of the Aut-O-Bee, the eliminator does away with both the B and C batteries and operates over a long period of time without care or attention. Yet the draw on the storage battery averages only one ampere, or just about the same amount of current used for a single headlamp.

There are no rotating parts to cause friction and wear out, consequently there are no replacement problems with the device. The Aut-O-Bee can be installed on the boat, car, or aircraft in a few minutes. Its shipping weight is five pounds with dimensions of 4½ by 5 by 5½ inches.

One of the difficulties with the old-style B-C battery operation has been that the radio set begins to decrease in efficiency at the outset, for the set starts to decrease in

efficiency as soon as the B battery goes down. With the Aut-O-Bee, the set works at the maximum peak of efficiency at all times.

Trade Literature

Jointite Cork Products.—Catalog booklet published by L. Mundet and Son, Inc., New York; a compendium of information on the uses of cork for insulation purposes, including useful data, specifications, tables, and charts for refrigeration, soundproofing, heat prevention, heat conservation, vibration deadening, condensation prevention. Copies may be had by application to the company direct or to the Editorial Department of this magazine.

Design 9 Centrifugal Compressor. Catalog 386, issued by B. F. Sturtevant Company, Hyde Park, Boston, describes and illustrates a centrifugal compressor, which was designed for quiet efficient operation, and the ability to deliver a comparatively wide range in air volumes at an almost constant pressure.



American Shipbuilding

Edited by H. C. McKinnon

Santa Rosa Launched.—First of four liners building for the Grace Lines-Panama Mail Service of San Francisco by the Federal Shipbuilding & Dry Dock Company, the *Santa Rosa* was launched on March 21. As the vessel slid down the ways a bottle of Golden State champagne was broken over her bow. The bottle of champagne had been carried from Sonoma County, California, to New York especially for this ceremony. Miss Wendy Iglehart, daughter of D. Stewart Iglehart, president of W. R. Grace & Co., was the sponsor.

The *Santa Rosa* and her sister ships will be identical, except for interior furnishings, and they were designed by Gibbs & Cox, Inc., of New York. They are 508 ft. long, over-all, 484 ft. between perpendiculars, 72 ft. beam, 26 ft. 1 in. load-draft. They will have a speed at sea of 18.5 knots. Power will be supplied by steam turbines developing 12,600 indicated horsepower.

The other three vessels will be named *Santa Paula*, *Santa Lucia*, and *Santa Elena*. Keel for the latter has not yet been laid.

Lengthen Tankers.—According to advices from New York, the Standard Shipping Company, 26 Broadway, New York, is planning alterations to four tank steamers. Present plans call for the vessels being placed in drydock and an 18-foot section being inserted about midships. Bauer-Wach turbines will be installed at the same time to give additional power to propulsion machinery.

Contract for Navy Yard Cranes.—Contract was awarded last month on low bid of \$156,000 to the R. W. Kaltenbach Company, Bedford, Ohio, for two 25-ton floating revolving boom cranes, one to be delivered to the Mare Island Navy Yard on San Francisco Bay and the other to the naval destroyer base at San Diego. Pontoons 100 by 44 feet dimensions will support the cranes and they will be operated by diesel-electric power plants.

Large Reconditioning Contract.—United Dry Docks, Inc., New York, was recently awarded an important reconditioning contract for the reconstruction of the steamer *Sandy Hook* on a low bid of \$148,456. The vessel will be transformed into a modern, first class passenger steamer for operation by her owners, the Central Railroad of New Jersey, 143 Liberty Street, New York. Naval Architect George G. Sharp, 30 Church Street, New York, prepared the plans for the reconditioning work.

Gulf Vessels to be Reconditioned.—George G. Sharp, naval architect, with offices at 30 Church Street, New York, and J. F. Paige, 17 Battery Place, New York, are preparing plans and specifications for the reconditioning and addition of passenger accommodations to the steamers *Clavarack* and *Casey* for the Mississippi Shipping Company of New Orleans, La., N. O. Pedrick, general manager. This latter company reconditioned its steamers *Delnorte* and *Delsud* last year at a cost of about \$1,000,000 and a very satisfactory result both in efficiency of the job and in the attractiveness of the interior decorations was obtained. The entire bridge superstructure of each vessel was rebuilt and equipped to accommodate 28 passengers. Interior decorations were carried out under the supervision of Elizabeth Capers of New Orleans. The propelling machinery was modernized, the lines of the vessels were improved, and contra-rudder installed. Johnson Iron Works of New Orleans handled machinery installation and streamlining of hull. The Jahnecke Dry Docks, Inc. performed all work incidental to providing passenger accommodations.

River Boat.—A stern-wheel river passenger and freight steamer for The Alaska Railroad will be built under the Dep't of Interior, and W. C. Nickum, naval architect, 400 Polson Building, Seattle, Washington, has been authorized to prepare plans and specifications. Def-

inite details have not yet been announced, but her hull will be about 210 feet long, with 30 staterooms for passengers and capacity for about 250 tons of cargo. The vessel will be operated on the Yukon River. Bids will be received at the office of J. R. Ummel, office manager and purchasing agents for the Department of Interior, 71 Columbia Street, Seattle, Wash., as soon as plans are approved.

Electric Power for Cable Ferries.—The General Electric Company, San Francisco, recently received contract for installing electric power on the highway ferry across the Sacramento River at the Glenn County Road. There are probably hundreds of these small ferries operating across the sloughs of the delta region of the Sacramento and San Joaquin Rivers. These boats seldom carry more than two or three vehicles and operate on cables strung across the river and are pulled across by gasoline engine power. By a special device the General Electric Company plans to use an electric trolley cable to provide power for a single-phase motor. As the cable must be dropped to the bed of the river when the ferry is not running, a special device automatically cuts off the current at each end of the cable to prevent short circuiting of the electric power plant.

Ferry Reconditioned.—The ferryboat *Chippewa*, owned by the Puget Sound Navigation Company of Seattle, has been entirely rebuilt and reengineered and is scheduled to have her service trials about April 1st. She will be operated in regular service between Seattle and Bremerton.

As rebuilt by the Lake Washington Shipyards, the *Chippewa* has capacity for 1200 passengers. Her hull has been strengthened and somewhat changed to accommodate the new 2200 horsepower Busch-Sulzer diesel engine.

Seagoing Laboratory.—The Lake Union Drydock and Machine Works, Seattle, Wash., has an order from

the University of Washington at Seattle for the construction of a seagoing oceanographic laboratory, to be named Catalyst. The vessel was designed by Rowland and Strickland, and she is being built under a fund from the Rockefeller Foundation of \$200,000 to cover the construction of the vessel and her equipment with scientific instruments. The construction of the vessel will cost \$44,150 and she will be 75 ft. long, 19 ft. beam, and powered with a 140-horsepower Washington diesel engine. Accommodations will be provided for a crew of four and for twelve members of the scientific staff. Her laboratory will be equipped with all the best available instruments needed in the studies of Oceanography.

Repairs. — Commercial Iron Works, Portland, Oregon, was recently awarded contract for repairs to the steamer Ernest H. Meyer, which was damaged in collision with the steamer West Honaker in the Columbia River recently. The cost of repairs was \$11,500.

Repairs to the steamer West Honaker were performed by the Albina Engine & Machine Works of Portland at a cost of \$18,000.

Another important repair job which went to the Albina Engine & Machine Works of Portland last month was the overhaul and repair of the federal dredge Savannah, which cost \$11,885.

Water Taxis Ordered. — Nunes Brothers, Sausalito, Calif., have been awarded a contract by the Crowley Launch and Tugboat Company of San Francisco for two water taxis each of which is to be 47 ft. long and powered with a single 175-horsepower Hall-Scott motor. These boats are designed for speed with safety and a cruising speed of 18 knots. They are for operation on San Francisco Bay from Pier 14 to any point or ship for which there is a call. The Crowley Launch & Tugboat Company is said to be planning a fleet of these speed boats as the demand for this service develops.

Streamline Rudder.—At her recent annual lay-up at the Todd Dry Docks, Inc., Seattle, for general cleaning, painting, and minor hull and engine repairs, the steam freighter Point Ancha of the Gulf Pacific Line had a streamline type rudder installed which was expect-

ed to increase her cruising speed to 12½ knots or better.

New Barges.—Marietta Manufacturing Co., Point Pleasant, West Va., has an order from the Campbell Transportation Co., Pittsburgh, Pa., for ten steel covered cargo barges for operation on the Ohio River. Barges will have dimensions 132 by 35 by 10 feet.

Bids Received on C. G. Cutters.—Bids were opened last month in the office of the United States Coast Guard, Treasury Dept., Washington, D. C., for the construction of two patrol boats each to be 165 ft. long, 25 ft. 3 in. beam molded at main deck, 334 tons displacement, and 1300 shaft horsepower.

Two Tugs May be Built. — The Mesack Towing & Transportation Company, Inc., Pier 59, North River, New York, are reported to have retained Brown & Demarest, naval architects, Tottenville, Staten Island, New York, to prepare plans and specifications for the construction of two steam towboats and to call for bids for their construction. The boats are to be 104 ft. 1½ in. long, 26 ft. 11 in. beam, 13 ft. 2½ in. depth, powered with reciprocating steam engines.

Four Vessels for Reconditioning. —The United States Shipping Board recently approved the substitution by the American Scantic Line of the vessels Schenectady and Chickasaw for reconditioning and remodeling in place of the Minnetonka and City of Fairbury. The two former vessels and the Saguache and Bird City are to be reconditioned and remodeled by the New York Shipbuilding Co. for the American Scantic Line under the provisions of the Jones-White Act. Accommodations for approximately 60 passengers, refrigerated cargo holds, and strengthening of the hull against ice damage are to be included in the shipyard work.

Steamer Chiriqui. — The second of the United Mail Steamship Company liners to be completed by the Newport News Shipbuilding & Dry Dock Company—the steamer Chiriqui—arrived in New York, March 17 and sailed March 24 for San Francisco, where she will enter her regular service. The Chiriqui is identical to her sister ship the Talamanca delivered in January. She is 446 ft. 9 in. length over-all, 415

ft. between perpendiculars, 60 ft. molded beam, 34 ft. 9 in. molded depth to upper deck, 6963 gross tons and with a net tonnage of 3182. She has refrigerated or cooled air cargo capacity of 196,000 cubic feet.

These vessels have first-class accommodations for 113 persons in 61 staterooms. The passenger accommodations are beautifully decorated and very commodious, having all the comforts and conveniences of the larger passenger liners.

The machinery installation consists of two main turbo-generators supplying power to two main propulsion motors, one of which is fitted to each of the twin screw shafts. Power plants were supplied by the General Electric Company. The vessels are designed for a service speed of 17½ knots.

The third of these vessels, the steamer Segovia, which was burned at the outfitting pier at Newport News while she was nearing completion, is still at the shipyard. According to reports this vessel has been declared a total loss and insurance paid to the builders. The vessel was 95 per cent. completed, and the equipment still on shore at the time of the fire is credited to the underwriters. The hulk has been turned over to the shipbuilding company, but no official announcement has yet been made as to whether the hull will be rebuilt or abandoned.

Three identical vessels are under construction by the Fore River Plant of the Bethlehem Shipbuilding Corporation.

Four Service Launches. — Four diesel-powered launches have recently been built by Chas. H. Stowman & Sons, Dorchester, N. J., for the U. S. Public Health Service, Foreign Quarantine Division. They were designed by P. W. Clark, naval architect for the Public Health Service, Washington, D. C. They are intended for fumigation and general duty in connection with their several quarantine stations.

The launches are 41 ft. length over-all, 12 ft. molded beam, 4 ft. draft. Each is powered by a Fairbanks-Morse diesel engine developing 45 horsepower and giving a speed of 9.2 to 9.4 knots. The engines are started and stopped in the engine room, but otherwise all are designed for one-man pilot house control.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of March 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W., Seattle, Wn.

North Star, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Bell St. Terminal, Seattle, for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1500 H.P. McIntosh & Seymour diesel eng.; 14 knots speed; launched 1/18/32 deliver 3/32 est.

GENERAL ENGINEERING & DRY DOCK CO.,

Oakland, Calif.

Purchasing Agent: A. Wanner.

Marshall C. Harris, hull 26, suction dredge for American Dredging Co., San Francisco; 150 L.B.P.; 45 beam; 12 depth; keel 11/23/31.

U. S. NAVY YARD,

Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long; 35 knots speed.

U. S. NAVY YARD,

Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs. West Cape, Shell lighters Nos. 2 and 4. Texaco barge 259, strmr. Santa Maria, strmr. Catalina, strmr. Point San Pablo, strmr. Wapama, strmr. Kathrina Luckenbach, tug F. A. Douty (also cast iron propeller), U.S. G.G. cutter Cahokia, strmr. Solano, strmr. Admiral Watson (also one forged steel tailshaft), m.s. H. T. Harper, ferry strmr. Yerba Buena, strmr. Limon, strmr. President Wilson, tug W. B. Storey, strmr. President McKinley, strmr. Talamanca. Repair sections of exhaust lines; strmr. Lebec 2 wildcats for anchor windlass; strmr. Deroche. Deck repairs; strmr. Silverash. Caulk inside 2 bait tanks on deck; launch Rainbow. Make 6 steel springs for M.E. m.s. Murena. Drydock vessel for survey; strmr. Waterville. Drydock and misc. repairs; strmr. Yale. One bronze propeller; tug E. P. Ripley. One forged steel tailshaft; tug W. B. Storey. One tailshaft; strmr. Ernest H. Meyer. Misc. repairs; strmr. La Brea, Cathwood Pacific Pine, California, La Perla, Point Chico, m.s. Murena, Silvercypress,

Otokia, Lio, Ida Knudsen, Marpessa, launch Ubuyu Maru.

LAKE WASHINGTON SHIPYARDS, Seattle, Wn.

Remodeling and installing new diesel engine; Ferry Chippewa.

THE MOORE DRY DOCK COMPANY, Oakland, Calif.

Drydock and misc. repairs; strmr. Panaman, Western Pacific Barge No. 1, strmr. Hawaiian, tug Sea Salvor, ferry strmr. Calistoga, strmr. American, strmr. Stanley Dollar, strmr. Mericos H. Whittier, strmr. Alaskan, strmr. Margaret Dollar, strmr. Mexican.

PRINCE RUPERT DRYDOCK & SHIPYARD

Prince Rupert, B.C.

Docked, bottom painted, and misc. hull repairs; United Church Mission boat Thomas Crosby. Docked, cleaned, painted, misc. repairs; Forestry launch Lillian D. Docked, cleaned, painted, misc. hull and engine repairs; 2 fishing boats. Misc. hull and engine repairs not requiring docking; 32 fishing boats.

PUGET SOUND NAVY YARD, Bremerton, Wn.

Misc. repairs and docking. Texas, Roper, Hale, Sirius. Misc. repairs; C. G. Chelan. Misc. repairs incidental to operation as district craft; Mahopae, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS

Bath, Maine

Hermes, hull 151, twin screw, steel patrol boat for U. S. Coast Guard 165 ft. long; diesel eng.; keel 5/20/31, launched 2/23/32; delivered 3/4/32.

Icarus, hull 152, same as above; keel 7/22/31; launch 3/19/32 deliver 4/31/32 est.

Perseus, hull 153, same as above; keel 9/15/31; launch 4/11/32 est.; deliver 4/22/32 est.

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy, 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,

Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement, deliver 8/15/32 est.

Monterey, hull 1441, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20 1/2 knots; 3 steam turbines; 22,000 S.H.P.; 12

W. T. boilers, launched 10/12/31, deliver May/32 est.

Lurline, hull 1447, sister to above; deliver Jan./33 est.

Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17 1/2 knots speed, 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 11/28/31.

Quirigua, hull 1445, sister to above; launched 2/6/32.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORP., LTD.,

Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co. 262x45x15 ft., McIntosh & Seymour diesels; launched 11/5/31.

Hull 4289, dredge hull for Ellicott Machine Co., Baltimore.

COLLINGWOOD SHIPYARDS, LTD., Collingwood, Ontario

Purchasing Agent: E. Podmore.

Wm. J. Stewart, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed, twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.; keel 8/12/31.

DEFOE BOAT & MOTOR WORKS

Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.

Not named, hull 149, cutter for U. S. Coast Guard. 165 L.B.P., 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W.T. boilers; keel 12/15/31 est.; launch 4/15/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY,

Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U. S. Engineers Office, Memphis, Tenn.; 214x46x9'5", two TE steam engs.; 1200 H.P.; one delivered.

Hull 1134, one 24 in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6".

Hull 1137, one steel hull cattle barge for Jersey City Stockyards, 210 x 36'6" x 8'; 1410 gr. tons.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self propelled, 16-inch suction, pipe line dredge for U. S. Engineers Office, Vicksburg, Miss. deliver May/32 est.

**ELECTRIC BOAT CO.,
Groton, Conn.**

Cuttlefish, fleet submarine SS171 for U.S. Navy; deliver 12/29/33 est.

**FEDERAL SHIPBUILDING & DRY
DOCK COMPANY
Kearny, N. J.**

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32.

Santa Paula, hull 122, sister to above; keel 8/4/31; launch Apr./32 est.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel Apr./32 est.

**GREAT LAKES ENGINEERING
WORKS.**

River Rouge, Michigan

Empire, hull 279, dredge hull for Dumbar & Sullivan; 125 x 42 x 10 ft.; keel 4/4/32 est.; launch 5/9/32 est.; deliver 5/31/32 est.

**HOWARD SHIPYARDS & DOCK
COMPANY,
Jeffersonville, Ind.**

Purchasing Agent, W. H. Dickey.

Mark Twain, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launched 8/29/31, delivered at Cairo, Ill., 2/10/32.

Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft.; keel 3/14/32 est.; deliver 8/32 est.

**MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.**

Purchasing Agent: S. C. Wilhelm.

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6"; launched; deliver 5/1/32 est.

Captain William Clark, same as above; launched; deliver 5/1/32 est.

One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9"; launched; deliver 5/1/32 est.

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.; 132 x 35 x 10 ft.

**MIDLAND BARGE COMPANY,
Midland, Penn.**

Eight floating steel caissons for Foundation Co.; 6 delivered.

Two steel barges, for U. S. Government, 40 x 14 x 3'6".

One towboat hull for Earl Webster.

**NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.**

Purchasing Agent, R. L. Baldwin.

Hull 260, dredge for stock; 140 x 36 x 9'; keel 11/16/31; launched 2/13/32.

Hull 261, gasoline engine workboat for U. S. Engineers, Vicksburg; 31 ft. length; keel 3/16/32 est.; launch 4/14/32 est.

Hull 262, same; keel 3/10/32 est.; launch 5/2/32 est.

Hull 263, same; keel 3/10/32 est.; launch 5/2/32 est.

Hull 264, work boat for stock 40 ft. length; gasoline engine; keel 3/1/32 est.; launch 4/6/32 est.

**NEWPORT NEWS SHIPBUILDING &
DRYDOCK COMPANY**

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Chiriqui, hull 346, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 4/27/31; launched 11/14/31; deliver 3/18/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31.

Not named, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/29/32; launch 8/32 est.; deliver 12/1/32 est.

Not named, hull 348, sister to above; keel 4/32 est.; launch 7/32 est.; deliver 12/15/32 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31; launched 1/9/32; deliver 5/32 est.

Acadia, hull 351, sister to above; keel 8/31/31; launched 2/13/32; deliver 6/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver Mar./34 est.

**NEW YORK SHIPBUILDING CO.
Camden, N. J.**

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31; deliver in fall 1932.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launched 12/5/31; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31; launch 9/32 est.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31.

**SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland**

Purchasing Agent: W. J. Collison.

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.; 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng.; keel 3/15/32; deliver 4/29/32 est.

**SUN SHIPBUILDING & DRY DOCK
COMPANY,
Chester, Penn.**

Purchasing Agent: H. W. Scott.

Not named, hull 146 single-screw steamship for carrying loaded railway cars for Seatrains Lines, Inc., New York and New Orleans; 464'6" by 63'6" by 38'3"; 15½ knots speed; 8500 D.W.T.; keel 2/24/32.

Not named, hull 147, sister to above; keel 2/24/32.

**UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.**

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter

for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launched 10/7/31; delivered 3/9/32.

Hull 806, barge for Berwind-White Coal Mine Co.; 130 L.O.A.; 35 beam; 12'6" depth; keel 12/28/31; launch and deliver 4/1/32 est.

Hull 807, scow for City of New York; 70 L.O.A.; 30 beam; 7'6" depth; keel 1/18/32; launch and deliver 4/1/32 est.

Piermont, hull 808, ferryboat for Rockland Boat Corp.; 64'10" L.O.A.; 29' beam; 8'6" depth; 70 H.P. diesel eng.; keel 2/3/32; launched 3/5/32; deliver 3/15/32 est.

Irvington, hull 809, sister to above; keel 2/10/32; launch 4/5/32 est.; deliver 4/15/32 est.

**U.S. NAVY YARD
New York.**

New Orleans, light cruiser CA32, for U.S. Navy; 10,000 tons displacement; deliver 6/2/33 est.

**U.S. NAVY YARD
Philadelphia, Pa.**

Minneapolis, light cruiser CA36 for U.S. Navy; 10,000 tons displacement; deliver 10/2/33 est.

**U.S. NAVY YARD
Portsmouth, Va.**

Dolphin, fleet submarine SS169 for U.S. Navy; deliver 8/1/32 est.

Cachalot, fleet submarine SS170 for U.S. Navy; deliver 9/16 33 est.

Monterey Nearing Completion.—

The Matson liner Monterey, second of three passenger and freight liners for the San Francisco-Australia Service of the Matson Navigation Company—is nearing completion at the Bethlehem Shipbuilding Corp., Ltd., Fore River Plant, Boston, Mass., and will sail from New York on May 12 for her home port and for a round-the-Pacific cruise. The Monterey, like her sister ship Mariposa, is 632 ft. long, 79 ft. beam, and powered by three steam turbines developing 22,000 shaft horsepower. These are connected through double reduction gears to twin screws giving the ship a sea speed of between 20 and 22 knots. Lurline, third sister ship, is scheduled for delivery in January of next year.

Fire at Diesel Engine Plant. —

The plant of Washington Iron Works, Seattle, Wash., manufacturers of the Washington diesel engine and of a complete line of logging and lumbering machinery and tools, was partially destroyed by fire on March 22. The loss is estimated at \$150,000. The fire department believed the fire to be of incendiary origin, as several incendiary fires had recently been started in plants of Seattle's industrial district.



Marine Insurance

Edited by James A. Quinby

Unseaworthiness and Statutory Privilege

A Comparison of the Shipowner's Rights Under the Harter Act and Limited Liability Act

UNDER the Limited Liability Act, or R. S. 4282, the so-called "Fire Statute," no owner of a vessel is liable for fire damage to cargo unless the fire is "caused by the design or neglect of such owner." R. S. 4283, the Limitation of Liability Statute, permits a vessel owner to limit his liability for losses caused without his privity or knowledge. Aside from the relatively slight distinction between "design or neglect" and "privity or knowledge," these statutes are similar in that their benefits are refused only in cases where the owner (or a managerial officer of an owning corporation) has been guilty of active or passive participation in the cause of the loss. For this reason, limitation is rarely denied in collision cases. As collision is almost always a result of improper navigation, it would be necessary to show that an owner was actually directing the course of the vessel, or had knowledge of some structural defect which caused the collision, before his petition for limitation could be denied. For this reason, hull and liability underwriters assume a proportionately greater risk upon pleasure craft and fishing boats than upon larger vessels, since the latter are seldom, if ever, operated by their owners.

The Fire Statute

The bar to benefit raised by what we may call "causative fault" is clearly shown in the leading cases interpreting the fire statute. In *Williams Steamship Co. vs. Brayton Wilbur et al.* (The *Willfaro-Willsole*) 1926 A.M.C. 32, a cargo of fishmeal was damaged by fire due to spontaneous combustion. The trial court found that the cause of the fire was improper stowage and inadequate ventilation. It was also found that the general agent of the shipowner at the port of loading, who customarily supervised the stowage of cargo, knew of and acquiesced in the improper stowage of the fishmeal. The benefit of the fire statute was therefore denied, and the shipowner held liable for the damage. It will be noted that the vessel in this instance was unseaworthy at the in-

Uncle Billy

I signed as Chief that voyage on the Sally Anne Machree,
A limpin' lousy fuel-hog as ever put to sea.
We was two days out from Rio when the bridge begins to squeal
That the steerin' engine's haywire—she won't answer to her wheel.
Well, we checks the bloomin' engine and we finds it all O.K.
But the top and center rudder pintle's carried clean away.
With tiger-sharks around our stern like flies in Singapore
It wasn't healthy overside. We scratched our heads and swore.
Then I made a hook and bent it to a heavin' line and cast
Till I caught the rudder collar where the pintle came unfast.
We lashed her up and steered her from the winches, jury-style,
Which means the rudder broke again at every blinkin' mile.
Twelve days back to Rio . . . nothin' much, as such things go,
But we didn't sink the hooker and we didn't take a tow.

—J. A. Q.

ception of the voyage by reason of faulty stowage, but this unseaworthiness was not in itself enough to saddle the owner with liability. It was necessary to prove (1) that the faulty stowage caused the fire and (2) that the faulty stowage was due to the owner's fault or neglect.

In *The Eastern Glade*, 1926 A.M.C. 1123, a Shipping Board vessel operated by the Mallory Line sustained damage

to cargo from a fire due to improper use of bunker coal. It appeared that both the Mallory Line executives and Shipping Board officials knew of the necessity of using old coal before new coal, but failed to do so, with the result that the old coal became heated and caused the fire. As the owner was guilty of fault or neglect in connection with the cause of the damage, the defense of the fire statute was of no avail, and the cargo owner recovered. In both these cases the causal connection between the owner's neglect and the damage is apparent.

Unseaworthiness Alone Defeats Harter Act

Section 3 of the Harter Act provides in substance that if a vessel owner shall have used due diligence to provide a vessel in all respects seaworthy, he shall not thereafter be liable for the errors of his agents in navigating the ship. While there is still some doubt in our law as to whether or not there must be a causal connection between the specific item of unseaworthiness and the ultimate damage in a given case, there is clearly no requirement that the owner must be personally privy to the unseaworthiness before he can be denied the benefit of the statute.

This doctrine was clearly enunciated by our Supreme Court in *International Navigation Co. vs. Farr & Bailey Mfg. Co.*, 181 U. S. 218, in holding an owner liable for the failure of the crew to close portholes before the commencement of a voyage. The court makes the following comment:

"We do not think that a shipowner exercises due diligence within the meaning of the act by merely furnish-

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HEAD OFFICE



Ray A. Mitchell

ing proper structure and equipment, for the diligence required is diligence to make the ship in all respects seaworthy; and that, in our judgment, means due diligence on the part of all the owner's servants in the use of the equipment, before the commencement of the voyage and until it is actually commenced."

It therefore appears clear that a failure of due diligence to furnish a seaworthy vessel will deprive an owner of the protection of the Harter Act, whether such failure is that of the owner or his agents, but that in order to forfeit the protection of the limitation or fire statutes, the owner must be guilty of personal laxity.

This distinction is clearly shown in the recent case of *The Galileo*, 1932 A.M.C. 1, the facts of which are somewhat similar to those in the *Eastern Glade* case. The *Galileo* suffered a fire because her chief engineer placed new bunker coal over old bunkers. The Circuit Court of Appeals (2nd Circuit), in holding that the owner was entitled to the benefit of the Limited Liability Act, uses the following language:

"Unseaworthiness of a vessel has nothing to do with limitation of liability by the owner unless it exists with the owner's privity or knowledge. Lack of diligence to make the vessel seaworthy is, therefore, immaterial unless it is within the owner's privity or knowledge. Unless this be borne in mind, the use of the phrase 'lack of diligence to make seaworthy', which under the Harter Act is not limited to the owner's personal failure in diligence, may well lead to confusion when applied to the Limitation Act. In the case of *Malcolm Baxter, Jr.*, as appears from the decision of the district court (not officially reported), the vessel's hull had defects which an inspection would have disclosed, but the owner did not provide a suitable person to inspect the vessel, which it had purchased without any warranty of seaworthiness in the bill of sale. Hence the lack of diligence was the owner's and the loss resulting from unseaworthiness was within the owner's 'privity.' So understood, the case is quite in line with earlier authorities. In the case at bar, however, the lack of diligence was that of the chief engineer

and the owner was not only not in privity with the engineer's default, but was found by the court to be free from personal neglect."

San Francisco Underwriters Elect Officers

THE Association of Marine Underwriters of San Francisco have elected a new complement of officers to guide the destinies of the organization during the coming year. The president's chair will be filled by Ray A. Mitchell, who succeeds Walter L. Dawes, the San Francisco Marine Manager of Talbot Bird & Co., who was at the helm of the Underwriters group during 1931.

The new president has been a marine underwriter since 1913. He has served on numerous golf courses and on the front in France during the World War, having come through both of these trying experiences without serious casualties. He was formerly with the Phoenix Assurance of London and the Union Marine Insurance Company, later taking over the San Francisco marine managership of the Automobile Insurance Company of Hartford. For the past two years Mr. Mitchell has been a comanager of the San Francisco office of the Insurance Company of North America.

William J. Jansen is the new vice-president, having been advanced from the post of secretary-treasurer, which he filled last year. Mr. Jansen, who was formerly with J. B. F. Davis & Son, is now the San Francisco marine manager for E. C. Evans & Sons, agents for the Western Assurance Company.

The office of secretary-treasurer for the current year will be filled by Richard J. Lutich of Geo. E. Billings Company. Mr. Lutich was also formerly associated with J. B. F. Davis & Son.

The organization, headed by this able group of officers, recently held its 47th annual banquet, on which occasion the attendance was greater than at any time in its history. In addition to developing the social activities of the marine fraternity, the association sponsors a series of lectures each winter covering marine insurance, admiralty law, and kindred topics.

Unfair Use of General Average Guarantee

WHEN a vessel has suffered a mishap involving a probable contribution in general average from the cargo, it has long been customary to accept the cargo underwriters' guarantee as security



W. J. Jansen

known the world over as a guarantee of INSURANCE MARINE AND INLAND CARGOES INSURANCE COMPANY

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740 South BroadwayLONDON, ENGLAND
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for the payment of the cargo's proportion of general average. Upon receipt of the guarantee, insured cargo is released by the shipowner without the requirement of a cash deposit.

The guarantee is usually in the following form: "In consideration of the delivery from the S.S. of the below mentioned goods without requirement of deposit, we hereby guarantee the payment of all proper general average, salvage, and/or special charges for which said goods may be legally liable."

A recent decision of the New York Court of Appeals (Rebora et al. vs. British and Foreign Marine Insurance Co.) indicates that cargo insurers may be mistaken in relying too confidently upon the wording of the guarantee for protection from improper adjustments. In the case in question, the steamer Caserta stranded, suffered hull damage in being pulled off, and incurred expense in discharging and forwarding cargo, for all of which her owners demanded general average security.

The bills of lading provided that the adjustment should be made at Genoa by two individuals appointed by the shipowner. The bill of lading, taken in conjunction with the average agreement exacted from the consignee, provided that the adjustment so drawn should be incontestable.

The cargo underwriters, without closely examining the bill of lading, signed a guarantee in form substantially the same as that quoted above, and later claimed the right to take issue with the method of adjustment followed by the foreign adjusters.

The adjusters sued the cargo underwriters upon the guarantee to recover the amount set forth as due under the adjustment. The court held that in spite of the words "proper general average" and "for which the goods may be legally liable," the underwriters had expressly assumed an obligation to pay. The method of determining what they should pay was set forth in the bills of lading and the average agreement, with both of which documents the underwriters must be assumed to be familiar. In the court's opinion, the bill of lading and average agreement were by reference included in the guarantee, and the insurer thereby precluded from questioning the correctness of the adjustment.

The cargo insurer clearly had no intention of submitting to any such inequitable agreement when he signed the guarantee. The decision, if it stands, places the cargo insurer at the mercy of any unscrupulous or incompetent adjuster selected by the hull interests. Guarantees as security for the prompt delivery of cargo are instruments for the furtherance of the ends of

commerce. In the light of this case, a cargo underwriter in the future will display proper caution if he places upon every guarantee presented to him a proviso that irrespective of the provisions of the average agreement or bill of lading, the adjustment must be drawn in accord with the laws and customs applicable to the voyage. If such action is not practical, due to inevitable conflict with the interests of the assured, the underwriter should at least check the bill of lading and average agreement before signing the guarantee, and thus be forewarned in time to avoid the inequitable mandatory arbitration imposed in the Caserta case.

[It should be noted that the Caserta decision here discussed is not the case reported in 1931 A.M.C. at p. 51, in which a jury in a federal court reaches a similar conclusion upon a somewhat hazy set of facts.]



Walter L. Dawes

Deviation Under Hague Rules

IN the light of present agitation for the adoption of the Hague Rules bill of lading, the recent case of *The Stag Line vs. Mango*, 37 Commercial Cases 54 is of timely interest to the American shipping fraternity, since it embodies the ruling of the House of Lords on the question of "reasonable deviation" as allowed by the English Carriage of Goods By Sea Act.

The steamer *Ixia* was chartered to carry a cargo of coal from Swansea to Constantinople. When she started on the voyage she had on board two engineers who intended to make a test of her superheaters and then return to Swansea with the pilot. As the test was not completed when the pilot was dropped, the master deviated to St. Ives and landed the engineers. Before the steamer had returned to her proper course she went aground, and both ship and cargo were totally lost. The cargo owners sued to recover for deviation, and the shipowner defended on certain permissive clauses in the charter-party and further contended that the deviation was "reasonable" within



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the meaning of the carriage of goods by Sea Act. The trial court found that the deviation was unreasonable, and held the shipowner liable. (See comment in Pacific Marine Review for September, 1931).

The highest British tribunal has now affirmed the decision of the lower courts, basing the affirmation largely upon the interpretation of Subsection 4 of Article 4 of the Act, which reads as follows:

"4. Any deviation in saving or attempting to save life or property at sea, or any reasonable deviation, shall not be deemed to be an infringement or breach of these rules or of the contract of carriage, and the carrier shall not be liable for any loss or damage resulting therefrom."

It is noteworthy that most of the judges concurred in finding that the putting in to St. Ives was not so serious a deviation under the above statute as was the dangerous course pursued after leaving that port. The following language from the opinion of Lord Warrington (p. 61):

"In the present case we find a contract under which the ship is prima facie bound to pursue a certain course. It did not in fact do so, but pursued a course which brought it into a much closer proximity to the Cornish coast. This deviation was in the interest of the ship alone. In my opinion, this fact did not by itself make it unreasonable. It may well be that the interests of the cargo owners were affected in so slight a degree that the

master, acting as reasonable man and responsible both to ship and cargo, was entitled to regard the proposed course as one he was free to take. If he had decided, after leaving St. Ives, to stand away from the coast and thus regain the contract course I should have felt some difficulty in saying that the deviation was not reasonable and should have preferred the view of Greer L. J.; but, even so, it would not follow that we should be justified in saying that the conclusions of the other Judges in the Courts below were wrong, and unless we could say so we ought not to reverse their decision, which, as I have said, is a finding of fact. But, in my judgment, all difficulty in the way of agreeing with their view is removed by one element in the course selected by the master; namely, his decision that after leaving St. Ives the course should be at 1½ to 2 miles from the coast. I think it is clear that this course placed the ship and cargo in a position of peril to which they would not have been exposed if after leaving St. Ives the master had at once made for the open sea on his way to rejoin the contract route, and I fail to see any good reason for his not doing so. Nor can I agree that his decision amounted to mere negligent navigation. I think the course pursued from St. Ives southwards was as much a part of the deviation as that from Lundy to St. Ives, and the deviation would only be justified if the whole of it could be said to be reasonable. On the whole, I come to the conclusion that on this point also the appeal fails, and that it should be dismissed, with costs."

Freights, Charters, Sales

March 15, 1932

THE following steamers have been fixed with grain to U.K.: French str. L. D. Lina, British Columbia to U.K. Cont., February; British steamer Vulcan City, Vancouver, B.C., to U.K. Cont., 23 3, March, Wm. H. Pim, Jr., Co.; British steamer Tilsington Court, Vancouver, B.C., to 3 ports Continent, 25 6, March, James Richardson & Sons; Danish motorship Stensby,

Vancouver, B.C., to Continent, Bordeaux Hamburg Range 24 -, 2 ports 24 6, 3 ports 25 -; British steamer Appledore, Vancouver, B.C., to U.K. Cont., 23 6, March, Dale & Co.; British steamer Bradfyne, Vancouver, B.C., to Antwerp and Rotterdam, 23 6, April, L. Dreyfus & Co.; British steamer Masunda, British Columbia to Liverpool, March, Canadian American Shipping Co.; British steamer Troutpool, Vancouver, B.C., to U.K. Cont., March, Empire Shipping Co.; British motorship Sheaf Holme, Vancouver, B.C., to Avonmouth, March, Dale & Co.; British motorship Demeterton, Vancouver, B.C., to Avonmouth, April, Dale & Co.; British steamer Amber-ton, Vancouver, B.C., to Havre and Dunkirk, March, Dale & Co.; British steamer Langleeford, Vancouver, B.C., to Havre and Dunkirk, April, Dale & Co.; British steamer Mabriton, Vancouver, B.C., to London, March, Dale & Co.; British steamer Marthara, British Columbia to London, April, Canadian American Shipping Co.; Norwegian Steamer, Vancouver, B.C., to Hull, 23 -, March, Canadian Transport Co.; British steamer, Vancouver, B.C., to Havre and Dunkirk, 25 -, March/April; British steamer Induna, British Columbia to London, April, Canadian American Shipping Co.

The following time charters have been reported: British motorship Neptunian, Pacific Trade, 1 trip delivery British Columbia, redelivery China, March, Canadian Transport Co.; Danish motorship Victoria, 1 trip, delivery Vancouver, B.C., redelivery U.K. Cont., 1.35, W. L. Conyn & Sons.

The American motorship Z.R.3 has been sold by Atlantic & Pacific Packing Co. to J. C. Brownfield.

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Trade Notes

Coast Welcomes Diesel Expert.—Paul Von Gontard, grandson of Adolphus Busch, is now attached to the San Francisco office of the Busch-Sulzer Bros.-Diesel Engine Company.

Thirty-five years ago Adolphus Busch, returning across the Atlantic after his purchase from Dr. Diesel of American diesel rights for \$250,000 with that vision for which he was noted, told the ship's captain that ultimately diesel engines would propel the commercial ships of the world. It is fitting and timely that his grandson, Paul Von Gontard, should now carry on and extend the pioneer diesel work of Adolphus Busch, who built at St. Louis in 1898 the first diesel to be placed in commercial service in the world.

During the past ten years Mr. Von Gontard's business has taken him all over the world, including several years spent in Africa.

Sales Representatives.—McIntosh & Seymour Corporation has announced a rearrangement of its Eastern and New England sales districts. The former, comprising the states of New York, Pennsylvania, New Jersey, and Connecticut, is now in charge of H. C. Lenfest, with headquarters at 30 Church Street, New York. The New England district, comprising Massachusetts, Maine, New Hampshire, Vermont, and Rhode Island, is in charge of F. C. MacKrell with headquarters also at 30 Church Street, New York.

Pure Oil.—The Sharples Specialty Company was recently awarded a contract by the United States Navy Department to supply a centrifugal oil purifier for the new submarine *Cachalet* (V-8), building at the Portsmouth Navy Yard.

Apple Embargo.—The embargo which the French government recently placed against the importation of apples will not apply against apples from the Pacific Coast states of Washington, Oregon, and California, according to advices received by the General Steamship Corp., Ltd. The recent embargo, which excluded American fruits, has been revised to require that each shipment from the United States hereafter be accompanied by



Paul Busch Von Gontard, recently attached to San Francisco office of the Busch-Sulzer Bros.-Diesel Engine Co.

an American sanitation certificate showing that no San Jose scale exists in that shipment. Pacific Coast apples are said not to be infested with San Jose scale.

Port Construction Contracts.—Oakland Board of Port Commissioners recently awarded contract to Kennerson Mfg. Co. for installation of steel rolling doors in 360-foot extension to Outer Harbor Transit shed No. 2, bid \$3938; to Grinnell Company of the Pacific for sprinkler system, bid \$7942; for 8000 cubic yards of rock for Ninth Avenue pier, J. Catucci at 59 cents per cubic yard.

San Francisco Board of State Harbor Commissioners on March 17 awarded contract to Healy Tibbitts Co., San Francisco, for expansion of the present grain terminal at Islais creek with a structure 890 feet long to cost \$161,380; M. B. McGowan received contract for construction foundations for grain bins, bid \$14,187.

Trade Literature

Northern Rotary Pumps, Bulletin NH2, recently issued by Northern Pump Company of Minneapolis, De Laval-Pacific Company Pacific Sales representative. Bulletin describes and illustrates the NH series cycloid type Northern rotary pump in capacities from 50 to 700 gallons per minute and up to 500 pounds per square inch pressure for any liquid in applications where high efficiency is required under continuous duty. Copies of bulletin may be had on application to the

Editorial Department of this magazine.

Twelve Reasons Why is an interesting booklet published by The Hazard Wire Rope Company telling "why you save money with lay-set preformed wire rope." Hazard Wire Rope Company and American Cable Company are branches of the American Chain Company, which maintains offices and stocks in all important cities. George H. Luce is California manager of the Wire Rope Division of the American Cable Company and The Hazard Wire Rope Company, headquarters 425 Second Street, San Francisco.

Book Reviews

PRIVATE MEN-OF-WAR by C. Wye Kendall. 294 pages, 26 illustrations, handsomely bound and printed. Published by Robt. M. McBride & Company, 4 West 16th Street, New York.

A very interesting book giving a comprehensive picture of the rise and decline and final abolition of that picturesque figure—the privateersman.

A comprehensive index makes this interesting volume of great value as a reference work on privateers. Many of these gentry were close to piracy and not a few were executed as pirates both by the enemy and their own home governments. To those interested in the corsairs, buccaneers, brethren of the coast, and other irregular fraternities of the Spanish Main and the English Channel we advise the purchase of *Private Men-Of-War*.

BRITISH SHIPPING FINANCE.

Fairplay's annual summary. 625 pages, bound in cloth. Compiled and published by Fairplay Press, London, England. Price 15s. net.

This statistical reference book contains: A summary of the balance sheets and a list of principal shareholders of principal British shipping companies; a list of shipbuilders, ship repairers, and marine engine firms, with capacity; a summary of the marine accounts and financial position of British Insurance companies; a list of world ship sales reported in 1931. The information in this volume is officially correct and in this convenient form should be very valuable to all shipping men engaged in overseas trade.

Pacific Marine Personals

"NAMES ARE NEWS" BY PAUL FAULKNER

Fathometer.—A recent visitor to the San Francisco district was A. M. Skudre, chief service engineer for the Submarine Signal Company of Boston. While in northern California, Skudre visited all important marine offices and plants accompanied by Carl V. Lane, district representative and through whose efforts the Propeller Club of California heard an address by Engineer Skudre on the construction and operation of the Fathometer at its weekly luncheon meeting in the California room of the San Francisco Commercial Club.

Mariposa Explained.—L. L. Westling, assistant manager of the Engineering Department, Matson Navigation Company, delivered an address at a dinner meeting of the San Francisco Section of The American Society of Mechanical Engineers last month on the subject, "Design and Construction of Modern Ships, with Special Reference to the Mariposa." The paper was very well received and will prove a valuable record for the proceedings of The A.S.M.E.

(Mr. Westling completes in this issue of Pacific Marine Review his very interesting and instructive series on "Marine Refrigeration Simplified.")

Our Loss, Leviathan's Gain.—The friends of William G. Gilfillan on the Pacific Coast will be both glad and sorry to hear of his appointment to the position of purser of the United States Lines flagship Leviathan. Gilfillan is very well known to the shipping fraternity on the Pacific Coast, having served for many years in the Panama Pacific Line service, most recently aboard the steamship Virginia. Captain of the 1916 Notre Dame football eleven, Gilfillan was a lieutenant in the navy transport service during the World War.

Wilfred Matches, formerly assistant to Gilfillan on the Virginia, has been appointed purser aboard the Pennsylvania, succeeding Wesley Blanchard, resigned.

Old Friends Meet.—When Captain R. G. (Jock) Latta brought the Empress of Britain into San Francisco Harbor on her round-the-world cruise last month he was greeted by two of his old shipmates of twenty years ago—Edmund Aikman and R. W. Murray. These three Scotsmen served under Captain James Gillies on the first Empress of Britain (now Montroyal) twenty years ago as navigating officers.



Captain Robert Gilmore "Jock" Latta (right) and President Edward Wentworth Beatty (left) of the Canadian Pacific Railway, aboard the majestic Empress of Britain, a recent visitor to California. Captain Latta went out as officer on the old Montezuma 27 years ago, a vessel of 8360 tons. The Empress of Britain was a March visitor to San Francisco and Los Angeles.

and the meeting in San Francisco was the first reunion in many years. Captain Aikman is noted for his sea yarns. He is general superintendent of the Canadian Pacific ships at Vancouver. Captain McMurray heads the British Columbia Coastal Services.

Appointment.—Clay Hutchinson traffic manager for the W. R. Grace & Co. and Panama Mail Line in the Southwest, has announced the appointment of Morgan Huntoon as general freight agent to handle solicitation in southern California, Arizona, New Mexico, and Texas.

Huntoon joined the company last December, having previously been manager of the Garland Line at Los Angeles and later local manager of the Interoceanic Conference's weighing and inspection bureau.

Marine Surveyor Retires.—Captain W. C. McNaught, chief surveyor in the Columbia River district for the San Francisco Board of Marine Underwriters, has resigned after twenty years of service with the Board. He had been twenty-eight years in sail before he became a surveyor. A host of the captain's associates at Portland gave him a rousing, well wishing, farewell banquet last month.

Captain A. H. Bryant has been appointed to succeed Captain McNaught, transferring from Seattle where he has been located for the past four years.

Pilot Staff.—Two well known master mariners of the Pacific Coast have just been appointed to fill vacancies on the British Columbia Coast Pilot staff. They are Captain A. J. Gilbert, formerly of the Canadian National Steamships, Ltd.; and Captain Andrew "Andy" Johnstone of the Union Steamships, Ltd.

Captain Gilbert, a native of New Brunswick, was with the Dollar company previous to joining the Canadian Government Merchant Marine Service in 1919. He served aboard the steamships Canadian Sailor, Canadian Adventurer, Canadian Trooper, Canadian Observer, Canadian Farmer, Canadian Volunteer, and Canadian Coaster. He brought the new steamer Prince Henry out from her builders' yards in England and also served as master of the Prince Henry and Prince George.

Captain Johnstone joined the Union Steamship Company of British Columbia, Ltd., in 1909, having served aboard the Camosun, the Venture, and the Cardena. During the interval of the World War he served in the army and his record is a splendid one. He resumed service with the Union Company and leaves it only for the pilotage job.

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Ship.	Leave San Francisco	Leave Los Angeles	Arrive New York
*S.S. Santa Teresa.....	Mar. 31	Apr. 1	Apr. 23
*S.S. Conde.....	Apr. 7	Apr. 9	May 7
*S.S. Santa Cecilia.....	Apr. 13	Apr. 14	May 21
*S.S. Santa Ana.....	Apr. 27	Apr. 28	

Westbound

Ship	Leave New York	Leave Cristobal	Arrive San Francisco
*S.S. Santa Cecilia.....	Mar. 18	Mar. 27	Apr. 11
*S.S. Santa Ana.....	Apr. 2	Apr. 9	Apr. 23
*S.S. Santa Elisa.....	Apr. 16	Apr. 23	May 7

†Ports of call—Mazatlan, Manzanillo, Acapulco (north), Champerico, San Jose de Guatemala, Acajutla, La Libertad, La Union, Ampala, Corinto, San Juan del Sur, Puntarenas, Balboa, Cristobal, (Buenaventura via Balboa).

‡Refrigerator space. Carries combustibles and explosives.

Ports of call—Mazatlan, San Jose de Guatemala, Acajutla, La Libertad, Corinto, Puntarenas, Costa Rica, Balboa, Cristobal, Cartagena (eastbound only), Puerto Colombia (eastbound only), Havana (eastbound only), and New York.

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The March launching of the Santa Rosa, first of four passenger and freight liners, building for the Grace Line-Panama Mail Service, was a major event in the history of American shipbuilding. Among the notable personages of Grace Line personnel are Daulton Mann, executive vice-president of the Grace Lines (at left); C. G. Mallory, vice-president and general manager of the Grace Line Panama Mail route (center photo); and John W. Chapman, vice-president of the Grace Lines (lower photo).

Grace-Panama Mail.—A. C. Fels has been appointed manager of the Philadelphia office of the Grace Line-Panama Mail Service and the company has announced a change in its intercoastal service via Central American ports. This change is to include the ports of Philadelphia and Oakland in its American ports of call.

The first westbound sailing of the steamship Santa Elisa from New York will call at Philadelphia and sail from that port April 13. The first eastbound ship will be the Santa Teresa, sailing from San Francisco, March 31.

At Philadelphia the vessels will dock at Pier 40 South. This is a modern, double-deck pier, centrally located and served by the Belt Line railroad and permitting the interchange of freight with all railroads serving the Port of Philadelphia. The office will be under the direction of A. C. Fels and will be on the pier. He will have a complete staff to render satisfactory service to all shippers and receivers.

The sailing schedule under the new arrangements, westbound, will be: From New York to

Los Angeles Harbor	—19 days.
San Francisco	—21 days
Oakland	—23 days

Shore Appointment.—Announcement was made recently by R. J. Ringwood, freight traffic manager of the Panama Pacific Line, San Francisco, that Hugh Middleton, formerly assistant general freight agent of the line at Oakland, has



been transferred to Los Angeles as general freight agent.

H. G. Adam, general freight agent at Los Angeles, has been transferred to Oakland with the title of assistant general freight agent.

Eighty-eight Years Young.—Captain Robert Dollar, dean of American shipping, celebrated his 88th birthday March 20 at his home in San Rafael. Questioned by reporters as to his opinion of the present economic situation, he said:

"The world is crawling out of this depression, slowly but surely. I've been through six or seven of these slumps, and generally can predict their progress. We are on the upgrade. Have confidence. Good times are heading this way."

The Santa Rosa is due in San Francisco in mid-September; the Santa Paula will be launched in June; the Santa Lucia will take the water in October; and January, 1933 is the date for the launching of the fourth liner, the Santa Elena. A two-hour nationwide radio program announced the first ship's launching.





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Atlantic - Far East

WEEKLY SAILINGS from New York, FORTNIGHTLY from Boston to Honolulu, Yokohama, Kobe, Shanghai, Hongkong, and Manila. FORTNIGHTLY SAILINGS from Manila, Hongkong, Shanghai, Kobe, Yokohama, Honolulu to New York and Boston.

*Transshipment New York

Mediterranean - U. S. A.

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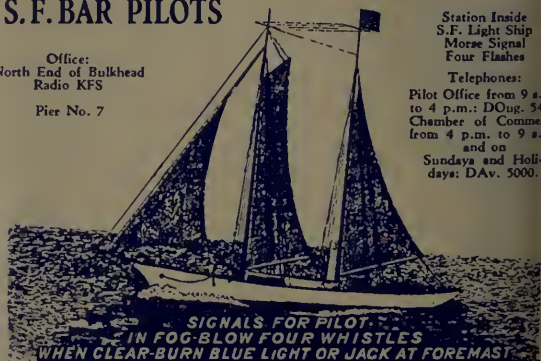
The Plaza Hotel is quiet, luxuriously furnished, with deep, restful beds, glistening tile baths and showers, excellent service and cuisine, convenient parking—every modern convenience for your comfort.

European plan. \$2.50 up, single. \$3.50 up, double. \$4.50, twin bed. Special weekly and monthly rates. Look for the "Doorway of Hospitality."

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Office:
North End of Bulkhead
Radio KFS
Pier No. 7



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S.F. Light Ship
Morse Signal
Four Flashes

Telephones:

Pilot Office from 9 a.m. to 4 p.m.: DOUG. 548
Chamber of Commerce from 4 p.m. to 9 a.m. and on
Sundays and Holidays: DAV. 5000.

And Lay Still

When on Station under Sail a White Light is carried at Mast Head. When under Power, a Red one under White; a Flare or Torch is also burned frequently.

Official News of the

PROPELLER CLUB

of California



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Baltour Building, San Francisco

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MONTH of March luncheon meetings of the Propeller Club of California, held Tuesdays, in the California room of the San Francisco Commercial Club, were outstanding in their presentation of excellent programs, a notable array of accomplished speakers whose choice of topics was heartily received by splendid attendance of members and their guests.

Reviewing the activities of March's interesting calendar, here is an outline of the Propeller Club's current events:

— P C —

March 1.—Speaker, Captain Harry Lyon, versatile commander who plotted the courses and shot the sights on the immortal air dash of the monoplane Southern Cross from California to Australia, with calls at Honolulu, Samoa, and Fiji. Captain Lyon's story of the greatest transoceanic hop was made amazingly impressive by the exhibition of a remarkable standard size cinema, transporting his audience from the Oakland take-off to the reception by a million souls in Brisbane. Further interest in the saga of the air lies in the fact that Charles Kingsford-Smith, control pilot of the Southern Cross is a brother of R. H. K. Smith of the American-Hawaiian Steamship Company.

— P C —

March 8.—Speaker, Edward H. Harms, assistant operating manager of the McCormick Steamship Company, operators of passenger and freight vessels between Pacific Coast ports and South America. Eddie Harms is one of our members and his talk carried us from port to port in South America, graphically describing trade methods and cargoes moving between the great coffee ports and the Pa-

cific Coast. Vocal and instrumental numbers were rendered by the South American Quartet, radio artists in costume.

— P C —

March 15.—Speaker, Donald K. Lippincott, an authority on the absorbing subject of Television, who gave us an insight into the amazing future of this scientific achievement. His remarks were made the more interesting through illustrations, and his explanation was understandable to both engineers and nontechnicians.

— P C —



To Golf Chairman G. M. "Dad" Le Count and his capable committeemen goes the success of the Propeller Club's 1932 Spring Medal Play Championship!

— P C —

March 22.—Speaker, Arnold M. Skudre, chief service engineer of the Submarine Signal Company of Boston. Engineer Skudre's discussion on the application and construction of the Fathometer, which gives continuous visual report of soundings while a vessel is underway, was accompanied by a display

of the units and materials used in assembly of the fathometer. An instrument was displayed in operation.

— P C —

March 29. — Speaker, Captain Carl Kircheiss of the Hamburg-American Line, in port at San Francisco, recited some of his under-seas service with the German forces during the World War, and presented an educational description of modern whaling practice and whaling equipment.

— P C —

Golf Championship. — At the beautiful Sequoia Golf and Country Club in the Oakland hills, the Propeller Club's 1932 Spring Golf Tournament medal-play-at-a-handicap, brought forth a strong turnout on March 31. In our next issue we will publish a complete report of results, and explain who won what prizes, how, and why. Care was cast overboard for the occasion, a hearty and wholesome dinner was enjoyed, many were the talks and much was the merriment, victor and vanquished alike voting the day an all round success. C. M. "Dad" Le Count, golf chairman for 1932, and his able committee, namely Vernon Showell, Russ Pratt, Tom Forster, and F. P. Ritchie, are to be congratulated on the wonderful time had by each and all!

— P C —

Propeller-Doctor Arthur A. O'Neill's reappearance at our weekly gatherings was hailed with pleasure by everyone. The good doctor has recovered from a bad siege of illness, and to see him out of hospital is the best kind of news.

— P C —

In Memoriam—our dearly beloved friend and member — Lon C. Swain.



Edward B. Pollister, president of the Busch-Sulzer Bros. Diesel Engine Company, is coming to the Pacific Coast to supervise the operation of his engines on the converted ferry Chippewa, trial trip early in April. A. A. Tacchella, Pacific Coast representative, is also attending the trials.

Transportation Club.—The Transportation Club of San Francisco celebrated its twenty-eighth anniversary on March 19, claiming to be the oldest organization of its kind in the United States. New officers for the coming year were installed at the club rooms at the Palace Hotel.

The new president is C. E. Donaldson, traffic manager of the Shell Oil Company, succeeding Roscoe C. Bray, traffic manager of the Trojan Powder Company. (Mr. Bray is also a vice-president of the Associated Traffic Clubs of America and a former president of the Pacific Traffic Association.)

First vice-president is Walter J. Lane, traffic manager of Guggenheimer & Co.; second vice-president is W. S. Dawson, assistant general freight agent, Southern Pacific Company; Secretary-Treasurer is F. H. Hocken, assistant general freight agent, Western Pacific Company.

Directors are: L. R. Everett, Santa Fe; Thos. H. Fox, Illinois Central; W. E. Carpenter, Railway Express Agency; Chas. S. Perkes, Dollar Steamship Lines; R. O. Hoedel, Pacific Telephone & Telegraph Company.

Peter B. Kyne was toastmaster at the banquet. Other speakers included Mr. Bray, Harry Adams, retired chief of the Western Pacific; Rear-Admiral Cole, U.S.N.; and General Thornwell Mullally.

New Seattle Office.—Grace Lines' Panama Mail Service has established a general passenger office in Seattle, in conjunction with

the present office of W. R. Grace & Co. W. D. Vanderbilt, district manager for the latter will assume charge covering territory of Washington, Oregon, British Columbia, Alberta, Saskatchewan, and Alaska. Charles S. Long has been appointed Northwestern passenger agent, assistant to Vanderbilt.

Admiral Line Service.—Four vessels of the Admiral Line (Pacific Steamship Co.) operating in Pacific Coast coastwise service in January were replaced by four of the former fleet of 22 Transmarine vessels purchased by the Dollar interests and brought to the Pacific Coast. Admiral Day replaced Admiral Sebree; Admiral Senn replaced Admiral Dewey; Admiral Gove replaced Admiral Peary; Admiral Wood replaced Admiral Moses. Two others, the Admiral Laws and Admiral Cole, were placed in service last November.

"Three Squares a Day."—If you wish to know what quantity of food is required to satisfy the healthy appetites of the boys serving on the American merchant fleets, ask Purchasing Agent J. M. Pruner of the American-Hawaiian Steamship Company. Pruner has just completed a compilation of figures covering the consumption of "vittals" for the year 1931 by officers and men aboard the freighters of the American-Hawaiian Line, the Williams Line, and the Oriental Service of the Oceanic and Oriental Navigation Co.

Meat, bread, and potatoes form the backbone of the "three squares a day" served aboard these freighters, with butter, milk, eggs, coffee, and sugar coming next in line. In the way of statistics, Pruner re-

ported that the men consumed 705,300 pounds of fresh meat; 71,100 pounds of poultry; 782,100 pounds of flour; 395,000 pounds of potatoes; 55,600 pounds of butter; 190,000 pounds of sugar; 46,000 pounds of coffee; 136,500 cans of milk; 31,600 pounds of fresh fish; and 1,080,700 eggs. In addition to this, \$74,000 worth of fresh fruits and vegetables and various kinds of canned foods were supplied. The stewards of these various ships served, during the year, 1,794,610 regular meals, in addition to rations of coffee, sandwiches, and pie to men on duty at night.

Obituary

Death took Captain John I. Martin, veteran Pacific Coast mariner, March 7 at his home in Berkeley, California. He was 63 years of age. Captain Martin, who retired from the sea a year ago, had served for more than twenty-five years in the Sudden & Christensen service. Born in Finland, he came to San Francisco around the horn at the age of 14 in the old ship E. R. Sterling. He had his sailing master's license at the age of 21 and later when he obtained a steam license he joined the Sudden & Christensen company, remaining there until his retirement.

Captain Martin was well known and popular at San Francisco. He is survived by two daughters, Mrs. J. W. Stenlund and Mrs. J. A. Brooke, and by two sons, John F. and Gus A. Martin.

Samuel I. Marston, well known at San Francisco as liquidator in the office of the Collector of Customs, died suddenly March 10 at his home in Alameda. He was a Spanish War veteran and has been in the customs service at the Port of San Francisco for many years.

Edward Clarence Plummer, 69, vice-chairman of the United States Shipping Board since 1923, died at Washington, D. C., on March 20 following a prolonged illness. Mr. Plummer was born in Freeport, Maine, a member of the fifth generation of New England shipbuilders and mariners. He made his home in Bath, Maine. He went to sea as a young man and later was the author of books relating to the sea. As vice-chairman of the Shipping Board, Plummer brought all his enthusiasm and devotion to the work of promoting the welfare of the United States Merchant Marine.



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New Standard Oil Tankers

NINE new tankers are now under construction in Europe for the Standard Shipping Company, six being built in Germany, and three in Italy.

These vessels are all duplicates of one another, being 520 ft. between perpendiculars, 70 ft. moulded breadth, 38 ft. 9 in. moulded depth, and designed to carry 17,800 tons deadweight on a draft of 30 ft. 5½ in.

All of these vessels are twin screw, four of them being equipped with M.A.N. 4 cylinder, double acting, solid injection units, each developing 2250 S.H.P. at 118 R.P.M. Two of them will be equipped with 6 cylinder, single acting, solid injection Krupp motors, each motor capable of developing 2250 S.H.P. at 120 R.P.M. The three building in Italy will each be equipped with two 6 cylinder, single acting, solid injection Fiat motors, also developing 2250 S.H.P. at 120 R.P.M.

All machinery, except the main propelling units, will be steam operated, the steam for the auxiliary units required while the vessel is at sea being developed by specially designed exhaust gas boilers, manufactured by the Clarkson Thimble Tube Boiler Company. The machinery and boiler spaces will be protected against fire by a Lux installation, but for all other parts of the vessels, including the cargo tanks, the usual arrangement of steam smothering will be used.

In order that there may be ample steam available in case of fire, the exhaust gas boilers are interconnected with regular Scotch donkey boilers, under which latter, Todd automatic fuel burners, designed particularly for this special service, will be fitted. This unique ar-

rangement will make available for instant use large quantities of steam, and should the steam smothering valves be opened, the burners under the donkey boilers will automatically ignite, the size of the flame being directly controlled by the amount of steam consumed. A complete description of this new type Todd burner will appear in the April issue of Pacific Marine Review.

The new tankers will have a speed of over 12½ knots, will be equipped with gyro-compasses, radio direction finders, and other modern navigating instruments, and the quarters are arranged in accordance with the most modern ideas, as is the Standard Shipping Company's usual practice.

Trade Notes

Vancouver Marine Equipment Firm.—Ellis & Joerss, Ltd., is new name of Ellis Marine Co., 1925 W. Georgia St., Vancouver, B. C.—recently reorganized, and with enlarged quarters and stocks. Carries full equipment of Junkers engines. J. P. Ellis is manager director; W. A. Joerss, president; A. Briggs, secretary-treasurer. Anticipates opening branch offices in the Yukon and Alaska.

New Valve.—Thrustor-operated valve—just announced by General-Electric—enables centralized remote control of gases or liquids under pressure. Sizes 2-12 inches, pressures 125-600 pounds per square inch. Designed for general industrial applications. Has self contained power unit, consisting of a motor controlled and improved hydraulic cylinder, which applies

pressure to the valve to open or close it. Speed of operation is easily regulated. All manufacturing and operating details are carefully worked out.

Safety Trophy Award.—An accident prevention trophy, awarded for the first time by the U. S. Navy Department, has been given to the Mare Island Yard for the best record of any navy yard or naval station for 1931. Only 48 temporary disabilities were suffered during the year. The yard employs at times several thousand workers.

Latin American Holidays.—American steamship operators may well take notice of the following legal holidays for the balance of 1932 in force throughout most of South America and approved by the Banking Association of Rio de Janeiro:

March 24—Holy Thursday

March 25—Good Friday

July 1—Bank Holiday

September 7 and 20—National holidays

November 2—Municipal holiday

November 15—National holiday.

(May 1—Labor Day; October 30

—Employees' Day; and December 25—Christmas, fall on Sunday).

Italian Subsidy.—Navigazione Libera Triestina has been granted a subsidy by the Italian Government, according to U. S. Consul Rollin R. Winslow, Trieste, of 12,900,000 lire with an extra 100,000 lire for each voyage made in addition to the compulsory sailings which include nine annual sailings to Pacific Coast of United States. Subsidy covers a period of five years and requires construction of one or more vessels of 15,000 gross tons register.

A Notable Anniversary

ON the Fifteenth of February, 1912, a new idea became practice in the propulsion of seagoing vessels. That date saw the successful culmination of exhaustive sea trials of the *Selandia*, world's first large ocean motorship. *Pacific Marine Review*, then, as now, keenly interested in all new and promising developments in marine engineering and shipbuilding, gave prominent mention to this very interesting event describing it as "truly a red-letter day in the epoch-making diesel engine era for ocean-going motorships *Selandia* is 370 feet long, 53 feet beam, 30 feet molded depth to upper deck, of 3200 tons net register, 4900 tons gross register, and 7400 tons deadweight capacity, having a loaded displacement of approximately 9800 tons. With about 100 tons oil fuel, galley fuel, and fresh water aboard, she made a speed of 13.35 knots on trial. Her sea speed fully loaded will be better than 11 knots. Two Burmeister & Wain oil engines, a perfected diesel type operating at 127 revolutions per minute, generate an aggregate power of 2500 indicated horsepower on twin shafts. These engines are of the four-stroke type and single-acting and are reported as perfect and handy as could possibly be desired . . . *Pacific Marine Review* extends to the owners and builders of *Selandia* its congratulations on the splendid results obtained on this trial trip."

Selandia is still in service, making regular 22,000-mile round voyages between Copenhagen and the East Indies, with many way and out-of-way ports of call. During her twenty years of service she has covered well over a million miles at sea. The cylinder liners of her engines were replaced once after twelve years of service. She has never been laid up for repairs. She still maintains her contract sea speed of 11 knots. Her fuel consumption for all purposes has been lowered from 152 to 140 grammes per indicated horsepower hour. During the last five years her total cost for repairs, including main and auxiliary machinery, has averaged \$4800 a year. The testimony of her engineers is that apparently the diesel engines of the *Selandia* will long outlast the hull. The very remarkable improvement in fuel economy is no doubt due partly to a change in the method of obtaining injection air that was installed in 1916.

Again we congratulate Burmeister & Wain and with them all builders of marine diesel engines and seagoing motorships. This record and the many similar records of other vessels certainly demonstrate the success of the diesel internal combustion cycle as applied to marine power plants.

Rains and Slides in Panama Canal

HEAVY rains over the watershed of Gatun Lake, beginning November 6, causing suspension of traffic through the Panama Canal, beginning in the afternoon of November 7, for the first time since October, 1923, due to the need of using the lock culverts to discharge excess water from Gatun Lake. Traffic was partially resumed on November 8 but interrupted again by a slide in Gaillard Cut, on the east bank, about half a mile north of Gold Hill, which occurred in the early morning of November 9. Transit was resumed in the afternoon of November 11, with the passage of 14 vessels not exceeding 25 feet draft. At that time 53 vessels had been awaiting transit, 29 from the Atlantic and 24 from the Pacific. This was the first time since December, 1923, that a slide delayed the passage of ships through the Canal; the last previous interruption was in 1920, from March 20 to 24.

Traffic through the Canal was suspended in the afternoon of November 7, when it became necessary to use the lock culverts in addition to the spillways to control the flood. Twelve of the fourteen gates at Gatun Spillway were open and in addition it was necessary to use the culverts at Gatun Locks and to spill water through the culverts at Pedro Miguel and over the spillway at Miraflores. By these means the level of Gatun Lake was held to a maximum of 86.81 feet, the danger point being 87 feet. The probable maximum inflow into Gatun Lake at any one time was 250,000 cubic feet per second; the probable maximum spillage from the Lake at any one time 180,000 to 190,000 cubic feet per second; and the probable total yield or runoff from Gatun Lake watershed between 30 and 40 billion cubic feet, equivalent to more than the total Gatun Lake storage between elevations 80 and 87 feet.

[From The Panama Canal Record]

Our illustration at right shows a fine example of a modern European motorship—the *Damsterdyk*, operated in the regular Pacific Coast-Europe trade by the Holland American Line and the Royal Mail Steam Packet Co. The vessel is of 12,000 tons deadweight; dimensions 490 by 64.5 by 40 feet; has cold storage space for 4000 tons of cargo; accommodations for 30 passengers. She is powered by a Harland & Wolf-Burmeister & Wain 8-cylinder diesel engine developing 6500 brake horsepower and driving the vessel through a single screw at 14 knots.



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Dependability PLUS

Dependable, on-time operation is assured both traveller and shipper by the new Matson liners "Mariposa" and "Monterey", from the very fact that they are brand new and that their equipment is the last word in modern marine construction.

But dependability plus is assured by their reserve machinery. They have duplicate units of every important piece of equipment. There are two boilers in reserve—any one of the six turbines driving the vessel can be taken out of service—all pumps are in duplicate—and to delay the vessel or interrupt any service aboard is quite impossible.

The "Mariposa" and "Monterey" will run with express-train precision on their route between San Francisco and Los Angeles and Hawaii, Samoa, Fiji, New Zealand and Australia. The "Mariposa" makes her initial sailing in regular service from San Francisco May 6—the "Monterey" June 3. Serving the North and South Pacific, they will be a delight to traveller and shipper alike.

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Quips That Pass in the Night

Scotch Bargain

Did you hear the story about the Scotchman who refused to buy the automobile until the salesman agreed to throw in the clutch?

Another Scotch Story

Sandy, who owned a picture theatre in Aberdeen, went to London to get some new ideas for advertising. While in London he noticed a sign over a movie house which said: "All persons over 80 will be admitted free!"

"Just the thing!" he thought to himself.

After his return to Aberdeen he put this notice on his theatre box office:

"All persons over 80 years of age will be admitted free—if accompanied by their parents."

Exactly

We watched a salesman demonstrate a new car to a sweet young thing. She said, "What's the handle for?"

He answered: "That's the brake. You can put that on quickly in an emergency."

"Oh!" she said, "just like a kimono."

"How's your wife, Mike?"

"She's terrible sick."

"Is she dangerous?"

"Naw, she's too weak now to be dangerous."

Just Get In Line

"I called on Mabel last night and I wasn't any more than inside the door before her mother asked me my intentions."

"That must have been embarrassing."

"Yes, but that's not the worst of it. Mabel called from upstairs and said, 'That isn't the one, mother!'"

Believe It Or Not

Once upon a time an enterprising poultryman crossed his hens with parrots, to save time. He used to spend much time hunting the eggs, but now the hens walk up to him and say, "Hank, I just laid an egg. Go get it."

"My wife explored my pockets last night."

"What did she get?"

"About the same as any other explorer—enough material for a lecture."

Domestic Note

Mrs. Joe: "Joe, did you bring home that pane of glass for the kitchen window?"

Joe: "I did not. I was after a 12x14 and all they had was a 14x12."

Mrs. Joe: "You poor boob, why didn't you take it? You could put it in sideways, couldn't you?"

"Waiter, why do I find a piece of rubber tire in this hash?"

"I really don't know, sir, except that the automobile is replacing the horse everywhere."

"Pop, what's a monolog?"

"A monolog is a conversation between husband and wife."

"I thought that was a dialog."

"No, a dialog is where two persons are speaking."

Or Maybe Father Is.

"Father," said Jimmy, running into the drawing room, "there's a big black cat in the dining room."

"Never mind, Jimmy," said the father, drowsily, "black cats are lucky."

"Yes," was the reply. "This one is; he's had your dinner!"

I Beg Your Pardon

Her hat was on one side, her clothes rumpled, and her shoes were in shreds.

"Were you knocked down by a motorist?" asked a sympathetic bystander.

"No, picked up," she snapped.

Both Forgetful

A letter received by a razor firm read as follows:

Dear Sirs: Please find enclosed 50 cents for one of your razors as advertised and oblige,

Ezra Toots.

P.S.—I forgot to enclose the 50 cents but no doubt a firm of your standing will send it anyway.

And here's the answer the razor firm sent back:

Mr. Ezra Toots:

Dear Sir: Your valued order received and we are sending razor as per your request, hoping it will meet with your satisfaction.

I. Cuttum & Co.

P.S. We forgot to enclose the razor but no doubt a man with your check will have no need for it.

Always the Truth

"What became of that unpaid bill Dunn sent to us?" remarked the bank clerk to his wife.

"Oh, that?" she asked. "I sent it back marked 'insufficient funds.'"

"Oh, I'm in such a perspiration!" cried the girl student.

"Miss Wilkinson," rebuked the austere teacher, "I hope I shall never again hear such an expression. Kindly remember that horses sweat, men perspire, but young ladies glow."

Or Hard Cider

A man was trying to explain to several companions the meaning of the word "phenomenon."

"It's like this," he began. "You see that field of thistles? Well, that's no phenomenon."

"No?"

"But suppose you were to see a lark singing above it, that wouldn't be a phenomenon either."

"No?"

"Even if there was a bull in the field at the same time, that wouldn't be a phenomenon."

"Eh—no."

"But if you saw that bull sittin' on a thistle singing like a lark—well, that would be a phenomenon."

Mayers, Jr.: "Daddy, what year was the battle fought in which the cow's husband ran in?"

Mayers, Sr.: "I never heard of such a battle, son."

Mayers, Jr.: "Sure, dad, you know, Bull Run."

"How bashful you are," a pretty girl said to a young man.

"Yes, I take after father in that respect," he said.

"Was your father bashful?"

"Was he? Why, mother says if father hadn't been so darn bashful I'd be four years older."

What a Relief.

She was working on some tiny garments when he came home. "Why, Mary," he said, "I didn't know." At first she looked puzzled and then with a smile said, "Don't worry, Jim, it isn't that. I'm just making some new seat covers for our new Austin."

The conditions of rich promise

For married bliss would be,

Where the woman is a "treasure"

And the man a treasury.

Pacific Marine Review

MAY, 1932



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. . . installations of every description . . . ice machine experts.
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Boiler Shop



Pacific Marine Review

The National Magazine of Shipping

VOLUME XXIX

MAY, 1932

NUMBER 5

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Official Organ
Shipowners' Association
of the Pacific Coast

Alexander J. Dickie,
Editor

Paul Faulkner,
Advertising Manager

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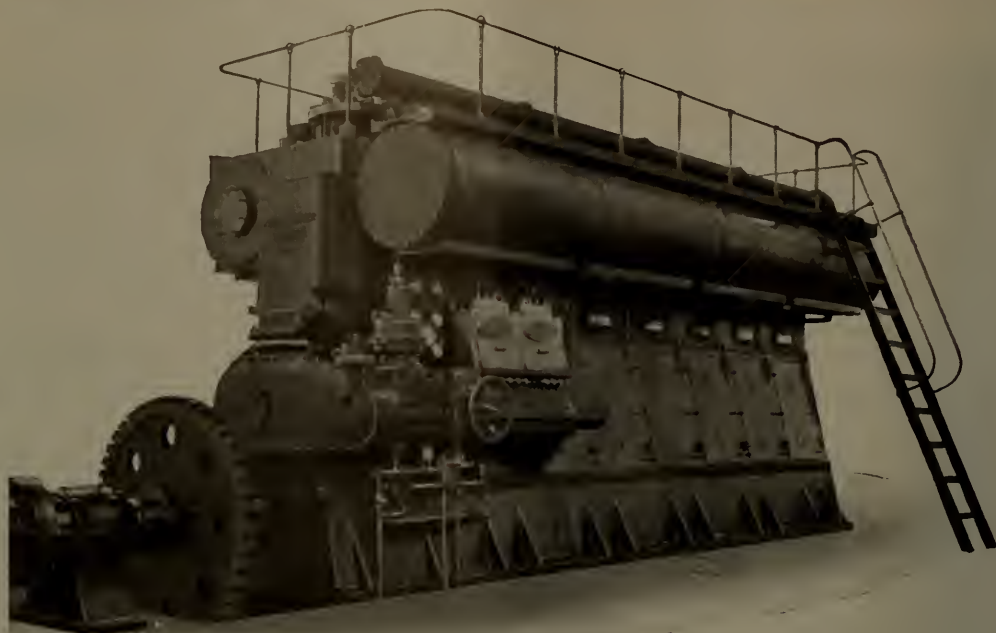
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A Picturesque View of the New St. John's Bridge over the Willamette River at Portland

*The main span has a width clearance of 1207 feet and a height clearance of
205 feet. The vessel is the British steamer Astronomer,
of the Harrison Line.*

(For further particulars see Page 181)



New Type 2130 S.H.P. Diesel—M.S. Chippewa—Puget Sound Navigation Co. *

Lower Cost Dieselization

The saving in cost of Dieselization, with smaller foundations and less hull alterations required for this new type of Busch-Sulzer Diesel weighing and costing about one-half as much as former types, is indicated by the short time required for installation.

The engine was first started in the ship 17 days after the last carload arrived and 10 days, 10 hours after the shaft was lowered into the bedplate.

Modernization » Higher Speed, Lowest Fuel Consumption

BUSCH-SULZER BROS.-DIESEL ENGINE CO.
ST. LOUIS, U. S. A.

Two Rector Street, New York

Rialto Bldg., San Francisco

Pacific Marine Review

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Editorial Comment » » »



California's Merchant Mariners

THERE must have come a great thrill to the hearts and minds of those 120 California lads aboard the steamship California State when that good vessel, after a trip round South America, proudly steamed up the Potomac and moored in the Port of Washington, D. C. A great thrill also must have come into the hearts of the President of the United States and his good wife as "Californians All" they received these boys on the White House Lawn, April 7.

Vessel officers and cadets were all ship-shape and immaculate for this occasion, and Californians resident in the nation's capital had every reason to be proud of this initial showing of the new California School Ship.

After five pleasant days in Washington, the steamship California State cleared for New York, arriving on the 14th. She left Manhattan on the 20th, and, following a leisurely trip via Panama, she will arrive home at San Francisco on the 29th of May, stopping at San Diego, Los Angeles Harbor, Santa Barbara, and Monterey enroute.

This five months trip during which the officers and cadets visited many ports of South America, Central America, Mexico, and the Pacific and Atlantic Coasts of the United States, is a liberal education in itself to these bright young minds. It has also forged another link in the chain of friendship binding the Americas into one commonwealth of ideals and aspirations for the future of international amity and international commerce.

What Price Democracy?

THERE is much complaint these days over rising taxes and pyramiding costs of government, and these items are certainly headed upward. Take the federal government. Cost approximately four billions a year, an almost incredible figure. When viewed by itself this figure staggers the imagination. The ordinary common garden variety of democratic citizen would have to work nearly two million years to get that total in salary. How can the United States Government spend that much in twelve months?

A crude break-down presents interesting points for study:

Veterans, pensions, bonus, approximately	1 billion
Public Debt, Interest	640 millions
Public Debt, Principal payments	500 millions
National defense, Army and Navy	644 millions
Public Works, buildings, roads, waterways, harbors	500 millions
General government administration	600 millions
Postal deficit	155 millions
Total (approximately)	4,039 millions

It will be noticed at once that costs of past wars are represented here by nearly one-half of the total. It must also be apparent to the philosophic mind that this huge expense of past wars is largely due to that strange psychology which holds the value of wealth to be greater than the value of life. When we declare a condition of war, government always exercises its right to draft life, but refrains from its equally valid right to draft capital. "Give me your life," says Uncle Sam, and "Lend me your money or sell me your property."

Had universal draft of all labor, capital, and services been exercised in our Civil, Spanish, and World War experiences, probably one half on our present governmental cost would be nonexistent. Much better to draft wealth and labor in war time and start from scratch at the end of the war than to pile up huge debts and later have to confiscate wealth in times of depression to meet the charges on those debts.

The Army and Navy budget is not excessive for a nation occupying our position as a world power. There might be some justifiable criticism of the manner in which this budget is expended, but changes in this large item should be for effectiveness of the service rather than cutting down the budget.

There is probably a large element of politics in that

500 million for Public Works, but that element is impossible to eliminate by any method yet discovered. The "pork barrel" will always be with us. This item provides considerable work for American labor which would otherwise be unemployed.

The 600 millions item for administration can be roughly broken down into departmental totals:— 300 millions for the Treasury; 50 millions for Commerce; 75 millions for Interior; and 80 millions for Agriculture.

It is obvious from these figures that much of the so-called "economy" talk in Congress is inspired either by ignorance or by politics, or both. Speaker Garner of the House of Representatives is much quoted in recent press dispatches. He opines that had the President and the Cabinet worked on a 10 per cent. cut in administration expenses last year the tax-payers would have been saved over 400 million dollars. The rough break-down of the budget given above shows that had every reducible item been reduced 10 per cent. the saving could not exceed 180 million dollars.

The largest items in the budget are directly under the control of Congress and are not subject to the administration departments.



Navigation and Steamboat Inspection

OUR latest slogan "Balance the Budget!" is being blared forth from many political trumpets all over the land. Councilmen are busv puttering with city finances; supervisors are adjusting county expenditures; legislators are debating tax systems and cost reduction; and, last but by no means least, Congress can think of little else but the budget and, in addition to the regular debates and decisions on general economies and additional revenue, has appointed a special Economy Committee to study consolidation and coordination of the administrative departments so as to effect permanent economies and better government.

This committee has introduced a number of resolutions for the consolidation of bureaus within departments. One of these—and one that is very interesting to ship operators—proposed to consolidate the Bureau of Navigation and the Steamboat Inspection Service.

Now, ship owners and ship operators, in common with other tax-paying citizens, are vitally interested in governmental economies, and if any substantial economy is to be derived from this consolidation, then the ship owners are, for it 100 per cent. If, however, this economy is to be gained by any curtailment of vital services rendered by these two bureaus and that curtailment operates in such wise as to delay and hamper the movement of the American ships, then the ship owners will be 100 per cent. against the proposed change.

There are no employed persons in either bureau from the Commissioner or Supervising Inspector General right down through the list who are getting sufficient salary so that their elimination would make much of a ripple on the surface of our national budget. The highest salary paid in either department is \$5000 a year, and the majority of the officials get less than \$3500. The latest annual report of the Commissioner and of

the Inspector General each emphasizes the need for additional trained assistants at certain American ports and in order to adequately serve the American merchant marine under the statutory requirements now in force. These statutory requirements are unchanged by the consolidation and it would therefore be highly improbable that such consolidation would effect any considerable economy if the present grade of efficiency in the service is maintained. On the other hand, if economies are insisted upon at the sacrifice of efficiency, then these governmental economies will be paid for by ship operators in delays to their ships and in many indirect burdens.

Ship owners and ship operators should have the final vote in this particular matter, for in reality the expense of maintaining these two bureaus as now operated, or of the combined bureau as it will be operated, is a bill against shipping and costs the taxpayers less than nothing. A short resume of the financial history of these bureaus shows that they have turned into the treasury far more than the appropriations made for their support.

Treasury Department had charge of Navigation from 1789 to 1884, when the Bureau of Navigation was established. Prior to 1912 only regular appropriations for this bureau were for salaries at Washington. From 1875 to 1910 the expenditures under these appropriations averaged \$5000 a year. Since 1912 the expense of the bureau has been carried on budget and appropriation and all collections have been turned into the general treasury. In 1914 appropriation was \$160,510; expenditure, \$158,315.31; and \$1,951,065.10 in collection fees and fines were turned into the treasury. In 1922, appropriation was \$336,340.13; expenditure, \$329,576.62; and receipts turned into treasury, \$2,075,219.94.

Steamboat Inspection Service, established in 1852, charged a fee for the service of its inspectors up to 1887. The returns from these fees turned into the treasury were more than sufficient to cover expenditures. In 1887 the fee system was abolished and the service carried on with an indefinite permanent appropriation until 1912, when it went on the annual budget and appropriation basis. The expenditure was \$990,790 in 1922.

It is evident, then, that in 1922 the combined expenditures of the two services amounted to \$1,300,366.62 and in the same year collections from shipping turned into the treasury by these services amounted to \$2,075,219.94. In other words, in 1922 the United States Government netted from the work of these departments a total of \$774,853.32.

During the fiscal year ended June 30, 1931, the taxes, fees, and fines collected under the Bureau of Navigation and turned into the federal treasury totaled \$2,323,865.32. For the same period the appropriation for Steamboat Inspection Service was \$1,273,485.93, an increase of about 30 per cent. in ten years. We do not have the figures at hand for Navigation's budget for 1931, but if the appropriations for that bureau had increased 200 per cent. in the ten-year period the receipts from ship operators would still be ample to cover the cost of both bureaus.

We therefore contend that any proposed consolidation of these services should be considered not from the viewpoint of economy but from that of efficiency. Both services are now handicapped in their usefulness to shipping by conditions such as: Obsolete statutes requiring work now unnecessary; inadequate salary

schedules for experts; inelasticity in federal statutes as applied to local conditions; conflict in and overlapping of services delegated to Shipping Board and other federal agencies.

Freeing each bureau of such handicaps would accomplish more real economy than any consolidation which carried these handicaps over on the resultant combination.

The work done by the Steamboat Inspection Service and by the Bureau of Navigation is very important and very vital. There are no "soft plum" jobs in either service. The demand for the service of each agency is continually increasing.

Last year the United States Steamboat Inspection Service:— Made careful inspections of 6526 vessels with an aggregate gross tonnage of 14,823,870; made inspections of approximately 16,000 steam generators, 121,078 new life preservers, and tremendous quantities of the numerous other items that compose the equipment for safety and economy in modern marine transportation; examined over 15,000 applicants for certificate or license from A. B. to Master or Chief and passed 8841 of these applicants; held court as to the liability of licensed officers in marine casualties involving floating property damage totaling \$9,989,598; so effectively supervised the safety of passenger traffic in the merchant marine and inland water-way fleets of the United States that of 305,219,538 passengers carried on shipboard only 71 were lost, or one passenger lost for every 4,298,866 carried; and kept accurate and adequate records on all this work. Any modern corporation executive analyzing these figures must inevitably come to the conclusion that only because of low salaries and very expert personnel could this work have been done at such low cost.

If the special Economy Committee is open to suggestion, we would like to recommend a consolidation that seems to us much more fruitful in the direction of economy. Abolish the Shipping Board and the Bureau of Navigation and form a new Bureau of the Merchant Marine under the Department of Commerce. Turn over to this new bureau all of the administrative and regulatory responsibilities now connected with Shipping Board and Navigation Bureau. Turn over to the Steamboat Inspection Service the admeasurement of vessels now carried on by the Bureau of Navigation. Terminate all commercial operation of government-owned vessels, whether owned by Navy, Army, Panama Railroad, or Merchant Fleet Corporation whether operated directly or on agency contracts. Sell all such vessels now operating to the highest bidder. Sell or scrap all laid up merchant vessels owned by Merchant Fleet Corporation.

A Bureau of the Merchant Marine, so established, would probably be self-supporting after a year or two and the federal government would be entirely relieved of the expense of the Shipping Board.

In other words, the Economy Committee, in order to get real reductions in cost of government should look, not to those departments whose salary rates and personnel apportionments are based on the standards of 1887, but to those hectic World War creations whose standards of salary and efficiency are those of 1917-1929.

Foreign and Domestic Commerce

ANOTHER Bureau of the Department of Commerce that is under review by the Economy Committee is the Bureau of Foreign and Domestic Commerce. Strangely enough, this bureau, which during the past decade has done much constructive work in producing new lines and new outlets in both foreign and domestic trade, is now accused by some business interests as being "a useless expense."

Total cost per year of this bureau, with its connections in every foreign market and every domestic trade center, and its publication of almost incalculably valuable data, is less than 5 millions of dollars. The savings and sales possible to those who take advantage of the services offered by this bureau present profit opportunities running into the billions.

Here again there is great danger of being "penny wise and pound foolish" of "straining at gnats and swallowing camels."

There are plenty of places where expenses can be trimmed by amounts far in excess of five millions without involving loss of efficiency in government or loss to business. If we must slash, let us do so in calm effectiveness and begin on political rather than on administrative expenditures!



A Solution for Latin America Bonds

AT the April 25 meeting of the Foreign Trade Club of the San Francisco Chamber of Commerce, C. B. Lastreto of San Francisco offered a novel and rather commonsense program for treatment of Latin American bonds which would bring about resumption of trade with Latin America, restoration of reputation for American financiers, payment of interest to bondholders in the United States, and postponed, but certain, payment of principal. The plan, briefly outlined, is as follows:

Latin American countries to declare moratoria on these bonds. Bondholders to form associations and deposit bonds with trust companies. Financiers who negotiated bond sales to meet coupon interest obligations, charging Latin American countries with interest and the bondholders with a small collection commission on these service payments and using deposited bonds as security for the necessary funds.

Then the bondholders will receive their interest with little expense and greatly increased security; nullification will be avoided and value of bonds will enhance; and financiers will earn commission and interest on the service payments. This will enable government to lower tariffs raised for revenue to meet sinking fund and service charge obligations and to protect gold reserve. Trade will be resumed and convalescence of Latin American countries will be stimulated.

This would seem a very practical solution of a very complex problem. Once in force with details satisfactorily arranged, it would certainly tend toward a speedy restoration of normal trade relations in the Western Hemisphere.

Chronicler of Tall Ships Passes

FREDERICK C. MATTHEWS, age 71, internationally recognized authority on the history of sailing ships, passed away at his home, 110 Liberty Street, San Francisco, on April 8.

A native San Franciscan, Matthews, from his early boyhood, worked in various capacities on the San Francisco Embarcadero. As a boy he became interested in finding out and recording the actual facts about sailing vessels. Thus began a remarkable spare-time research hobby which led Matthews into contact and correspondence with ship officers, ship owners, and ship lovers the world around.

Many magazine and newspaper articles were written, notably a series on The American Clipper Ships appearing in *Pacific Marine Review* over a period of years.

Collaborating with Dr. Howe of Boston, Matthews prepared the great bulk of the contents of "The American Clipper Ships" into two volumes, published in 1926 and 1927 by The Marine Research Society of Salem. In 1930 and 1931 The Marine Research Society brought out the first two volumes of a series by Matthews under the title "American Merchant Ships."

Matthews wrote in a terse but very readable style. Scorning all "human interest stuff", he stuck to facts. All of his articles and his books are encyclopedia in character. They will be storehouses of the basic facts on American sailing ships—storehouses from which the future student may glean accurate knowledge and in which the future writer of sea romance may find inspiration and incident for many a wonderful tale of life afloat in the good old days of sail.

"An honest man's the noblest work of God" said Burns. F. C. Matthews was the most honest man we have ever known.



Frederick C. Matthews

Pending Discussion of Shipping Problems

AROUND-TABLE discussion of American merchant marine problems will be one of the outstanding features of the Twentieth Annual Meeting of the Chamber of Commerce of the United States to be held at San Francisco, May 17-20.

Leaders in the shipping industry, both operators and builders, will participate in the discussion of such questions as:

"How does our merchant marine compare, ship for ship, with foreign shipping?"

"Are changes in our laws needed to provide adequate protection to the American merchant marine against the competition of foreign low cost shipping?"

"How does the extension of direct American flag shipping services to the trade regions of the world affect our commerce?"

"What should American shippers do to give 'reasonable preference' to American shipping, other things being equal?"

"What other steps should be taken to promote patronage of American vessels?"

"How far can the Intercoastal Shipping Conference meet the requirements of the situation?"

"Should there be governmental regulation of maximum and minimum intercoastal rates of all carriers? If so, by what agencies?"

The merchant marine group session will be presided over by Fred W. Sargent, president of the Chicago and Northwestern Railway. Among the leaders of the discussion will be H. G. Smith, president, National Council of American Shipbuilders, New York, and Homer L. Ferguson, president, Newport News Shipbuilding & Drydock Co., Newport News, Virginia.

In a statement announcing the program for the round-table, the National Chamber of Commerce points out:

"American shipping, after a period of government ownership and operation, has, during the last decade, been put in the main on a basis of private enterprise."

"This post-war progress has provided direct service to virtually every important trade region of the world. Do American business men appreciate what these shipping services do for the benefit of our foreign trade? American shippers provide patronage by reasonable preference to American flag vessels, other conditions being substantially equal?"

"The foundation of an American-built and American-operated merchant marine must be a sound public policy. To what extent do our present policies meet these requirements? Do they assure the continuance of a sound shipping and shipbuilding industry?"

"A sound answer to these and other important merchant marine problems is expected to be developed by this group session."



Back-Breaking Straws

ON new tax measures there are always many irritants. No legislator has found a formula for completely painless extraction. But in some cases the irritant becomes that proverbial "last straw that breaks the back" of the individual or the industry. In such cases Congress should either remove the straw or provide some means for its support.

A case in point is the 10 per cent. sales tax on American motorboats and yachts which is included in the present tax bill having been passed by the House of Representatives, March 29. This 10 per cent. tax more than nullifies the protection afforded the American boat-building industry by the 30 per cent. tariff on foreign built motorboats and yachts. It will, if enacted into law, enable the foreign boat builder to compete successfully for the American trade and will throw out of work many American mechanics.

Another case is the proposed Senate Radio Act amendment which would impose a fee of \$15 a year on each wireless station aboard ship. Why penalize the installation of safety apparatus? This amendment will keep wireless off many of the smaller vessels that should be equipped and will penalize other vessels for complying with a federal law.

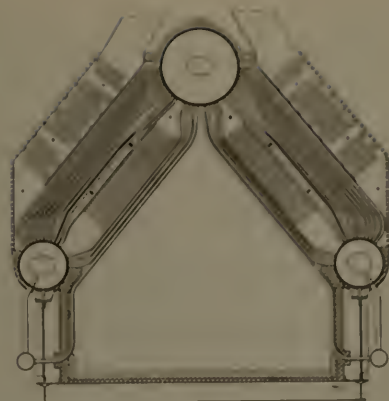
Water Walls Go to Sea

*A New Type 450-Pound Pressure Steam Generator
for the New Liners of the Grace Lines-
Panama Mail Service*

SANTA PAULA and Santa Elena, two of the four new Panama Mail Line steamers designed by Gibbs & Cox, Inc., and now building at the yards of the Federal Shipbuilding & Dry Dock Company, Kearny, New Jersey, are to be equipped with steam generators that are a new development incorporating some features never before included in marine boiler design. This new type of marine boiler was developed by the Foster Wheeler Corporation and one of them was put through exhaustive preliminary and official tests at the builder's plant, Cartaret, New Jersey, during last December. The results were very satisfactory; and, since these boilers are designed to operate at 450 pounds pressure, both the design construction and performance should be of great interest to marine engineers and ship operators.

This new steam generator is of the three-drum A-form type, with bent tubes, with superheaters installed between the tube banks, with economizers installed back of the banks, and with high side walls water-cooled (see section drawing at top of page). Such an arrangement provides an unusually large furnace volume and at the same time keeps the over-all height easily within the structural limits on shipboard.

The normal rating of each of the units to be installed on the Panama Mail ships will be 26,100 pounds of steam per hour. The principal characteristics of these units are:



A transverse section of the new water-tube marine type steam generators with incorporated superheater and economizers and water-cooled walls, built by the Foster-Wheeler Corporation for the new Panama-Mail Line steamers.

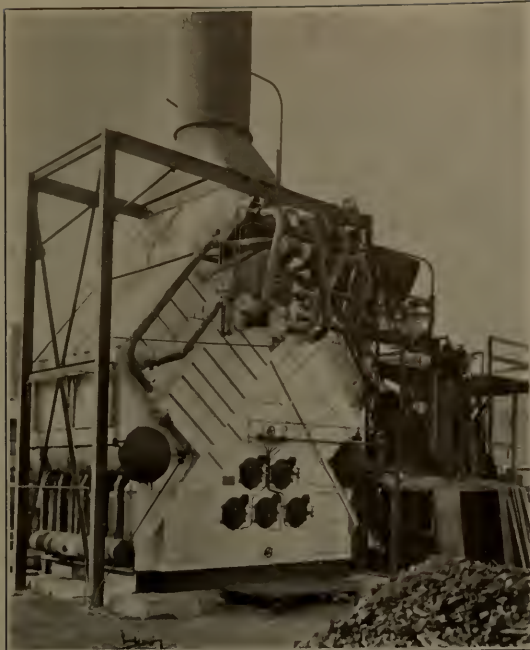
Boiler heating surface	4910 sq. ft.
Economizer heating surface	3024 sq. ft.
Superheating surface	1955 sq. ft.
Total heating surface	9889 sq. ft.
Furnace volume	1100 cu. ft.
Maximum designed boiler pressure	450 lbs.
Pressure at superheater outlet	400 lbs.
Steam temperature	750° F.

Combustion air is carried downward through a double steel casing at the back of the boiler to the bottom of the furnace, thence under the furnace floor plates and up the front casing to the burners. This arrangement gives slightly preheated combustion air.



The new Foster-Wheeler marine type boiler on test at Cartaret, New Jersey. Above, the rear elevation showing location of soot blowers and of the many thermo-couples; also group of shipping men interested in the test. At right, boiler partially assembled, showing ruggedness of construction.





Front view of the new marine type Foster-Wheeler steam generator.

cools the floor and back and front walls of the furnace, and is largely responsible for the remarkably low radiation losses.

As shown in the tabular data reproduced herewith, these boilers operate on normal capacity at 87.5 per cent. efficiency and on 25 per cent. overload at 86.0 per cent. efficiency.

The real advantage of this new design of marine steam generator from the merchant marine viewpoint is that it achieves great capacity at very high efficiency and at the same time saves weight and space as compared with the standard marine types. It is claimed

OFFICIAL BOILER TRIALS
OF
FOSTER WHEELER MARINE STEAM GENERATOR
FOR
PANAMA MAIL STEAMSHIP COMPANY

Date of tests	December 17	December 18
No. of test	11	12
Duration of test hours.	4	4
Steam pressure in drum lb./sq./in.	419	429
" " at superheater outlet	393	396
Final steam temperature deg.F.	756	798
Superheat	306	357
Steam per hour lb.	27,832	35,293
Oil per hour lb.	2,097	2,793
Lb. steam per lb. of oil	13.33	12.64
Oil in uptake	14.3	14.2
Temperature gases in uptake deg.F.	282	317
Temp. of feed water entering acon.	163	139
Temp. of feed water leaving acon.	263	249
Moisture in steam percent.	.8	.7
Heat added per lb. of water B.t.u.	1254.1	1310.1
Heat added per lb. of oil B.t.u.	16,750	16,560
Heat added per hour (in 1000 B.t.u.)	3,490	4,623
Heat in fuel fired per hour " "	3,987	5,350
Heat in fuel per hr. per cu.ft. combustion space	36,450	48,900
Calorific value of fuel oil	19,105	19,159

HEAT BALANCE

Overall thermal efficiency	87.5%	86.0%
Dry gas loss	4.4%	4.9%
Hydrogen loss	6.7%	6.7%
Radiation and unaccounted for	1.4%	2.4%
	100.0%	100.0%

that the use of this boiler, as compared with the straight tube cross-drum type, will result in a saving of 100 tons in boiler weights and in 600 tons of cargo cubic space aboard the Panama Mail Line vessels.

A thorough examination of the interior of the furnace and boiler was made after 400 hours of intermittent operation at full load and overload capacities. No damage or deterioration of any kind was indicated. Especially noteworthy were the clean surfaces of the refractory end and side walls of the furnace and of the tubes forming the water wall.

World's Lead in Exports

Calendar year 1931 Calendar year 1930

	Value	Value
1. New York	\$426,230,960	\$695,800,402
2. Texas	324,370,164	506,083,298
3. California	213,740,582	304,876,298
4. Pennsylvania	180,233,538	273,637,016
5. Illinois	141,009,291	200,909,613
6. New Jersey	122,251,968	186,840,362
7. Ohio	106,204,818	165,557,828
8. Michigan	83,453,736	184,353,941
9. Louisiana	82,007,288	151,971,581
10. Virginia	80,210,136	74,831,948
11. Massachusetts	60,922,137	93,583,274
12. Washington	60,366,938	66,667,880
13. North Carolina	43,075,734	81,356,142
14. Wisconsin	38,414,880	78,470,340
15. Oregon	31,722,986	52,239,619
16. Georgia	31,233,564	59,257,415
17. Indiana	30,604,426	55,628,025
18. Alabama	27,394,547	36,348,636
19. Maryland	26,912,150	43,035,963
20. Connecticut	25,067,376	39,141,314
21. West Virginia	24,036,262	32,943,261
22. Tennessee	20,826,417	36,987,374
23. Florida	19,170,824	26,567,957
24. Mississippi	17,810,203	30,282,003
25. Iowa	17,413,697	28,738,730
26. Minnesota	16,755,655	32,328,954
27. Missouri	16,070,274	32,465,262
28. Kentucky	14,484,581	22,671,781
29. South Carolina	13,250,054	25,055,900
30. Kansas	10,824,844	28,416,467
31. Oklahoma	9,815,578	21,060,417
32. Arkansas	8,657,745	14,880,863
33. Arizona	8,272,752	8,849,792
34. Rhode Island	7,989,504	12,051,536
35. Nebraska	6,195,944	10,613,505
36. South Dakota	4,797,339	6,467,417
37. New Hampshire	4,046,090	5,203,857
38. Porto Rico	3,813,204	4,625,185
39. Maine	3,678,270	6,949,128
40. Montana	2,955,913	4,303,010
41. Delaware	2,203,869	4,163,565
42. Vermont	2,029,788	2,923,111
43. Colorado	2,012,659	3,238,588
44. Hawaii	1,800,329	3,157,912
45. Washington, D. C.	840,621	981,691
46. Idaho	702,436	1,243,944
47. Utah	546,767	644,094
48. North Dakota	452,903	516,162
49. Wyoming	330,337	1,115,452
50. New Mexico	327,717	558,044
51. Alaska	296,158	248,223
52. Nevada	146,843	328,211
Total.	\$2,377,981,786	\$3,781,172,291

This table, recently released by the United States Department of Commerce, shows that in 1931 the United States, measured in terms of value in dollars, was the world's leading exporting nation and that Germany was number two and Great Britain number three. While this is, of course, matter for congratulation, we should not blind ourselves to the economic fact that a leader in exports should also be a leader in imports and must necessarily maintain leadership in imports of goods rather than gold in order to maintain profitable leadership in exports.

New Type

2-Cycle Diesel for Puget Sound Ferry

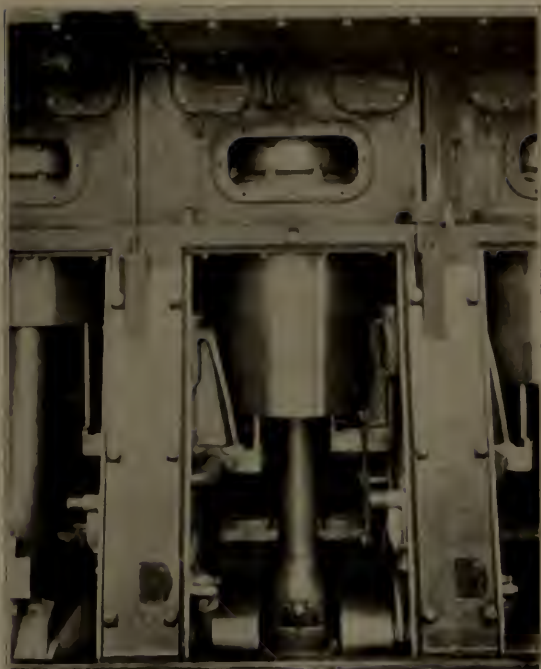
THE rebuilt and converted ferryboat Chippewa will be delivered during May from the Lake Washington Shipyards, Houghton, Washington, to the Puget Sound Navigation Company for operation on the Seattle-Bremerton route.

The principal item in the conversion of this vessel is the main propulsion engine. This unit is a diesel of the new Busch-Sulzer trunk-piston mechanical-injection type. It is the first unit of this type to be installed on the Pacific Coast and the first large unit of this type to be installed in an American vessel. Known as Busch-Sulzer D.H.M.T.-19, it operates on the 2-stroke-cycle, is directly reversible, and is scavenged by separate blower installation.

Eight cylinders, each 19½-inch bore by 27-inch stroke, generate a total of 2130 shaft horsepower at 210 revolutions per minute. The principal characteristics of this engine are:

Over-all length	29 ft. 0 in.
Over-all width	8 ft. 10 in.
Height, floor to top of fuel valve	12 ft. 11 in.
Clear height to pull pistons	18 ft. 10 in.
Weight of engine, pounds	196,000
Weight of scavenge blower, pounds	9,000

On the test stand at St. Louis, this engine was put through a full load 24-hour run and averaged 0.382 pound of oil per brake horsepower hour, exclusive of

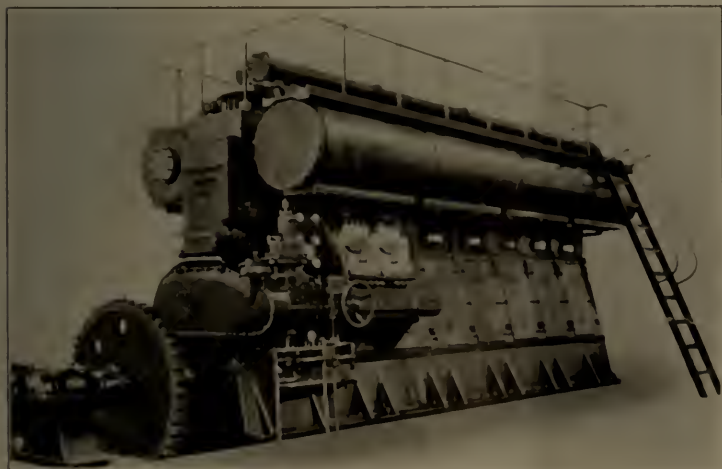


PISTON VISIBILITY—Close-up of the new Busch-Sulzer diesel with crank case cover removed, showing accessibility of piston and rod. Note the inspection holes in the so-called sludge chamber through which the piston surface is open to observation at all times.

the power required for driving the scavenge blower.

For lighting and for auxiliary power requirements on the Chippewa, the Busch Bros.-Diesel Engine Company supplied one of its standard 4-cycle air-injection units in the 5-cylinder size, generating 375 shaft horsepower at 360 revolutions per minute and driving a General Electric alternating current generator.

The performance of the power plant of the motor ferry Chippewa will be observed with great interest by the ship operators of the Pacific Coast.



NEW TYPE Busch-Sulzer diesel for motor ferry Chippewa. 8-cylinder, 2-cycle, 2130 shaft horsepower at 210 revolutions a minute. Note simplicity of control.

Trends in Our Overseas Cargoes

OCEAN BORNE CARGOES																		
Imports	TOTAL DRY CARGOES						OVERSEAS						WEST INDIES, MIDDLE AMERICA AND CANADA					
	Thousands of Tons	Percentages Carried					Thousands of Tons	Percentages Carried					Thousands of Tons	Percentages Carried				
		American		Foreign				American		Foreign				American		Foreign		
		S. B.	Ind.	British	Other			S. B.	Ind.	British	Other			S. B.	Ind.	British	Other	
1921	Total	12,357	44		56	6,895		37		63		5,462		53		47		
1922	Total	20,790	15	20	31	13,503	19	9	39	33	7,287	7	41	16	36			
1923	Total	23,050	12	19	28	14,706	17	9	32	42	8,344	2	37	20	41			
1924	Total	23,894	10	22	29	13,468	17	14	30	39	8,426	-	35	25	40			
1925	Total	24,903	8	20	30	14,990	14	14	29	43	9,913	-	29	29				
1926	Total	27,331	9	21	29	16,663	14	15	29	42	10,668	-	31	29				
1927	Total	25,351	8	24	28	15,071	13	19	27	41	10,280	-	32	30	38			
1928	Total	26,296	8	23	28	16,242	13	18	28	41	12,054	-	30	29	41			
1929	Total	29,067	6	25	29	17,899	10	23	28	39	11,168	-	28	32	40			
1930	Total	25,461	6	25	30	16,593	9	23	28	40	8,878	-	28	33	39			
1931	January	1,559	5	23	26	1,171	7	22	24	47	388	-	27	31	42			
	February	1,423	6	24	22	978	9	21	22	48	445	-	32	21	47			
	March	1,951	7	26	18	1,271	10	25	19	46	582	-	28	18	54			
	April	1,661	7	26	23	1,135	9	24	23	44	526	-	32	24	44			
	May	1,679	7	28	25	1,086	11	26	23	40	543	-	33	27	40			
	June	1,797	4	23	28	1,114	7	18	27	48	683	-	32	28	40			
	Total	9,931	6	25	24	6,755	9	23	23	45	3,107	-	31	25	43			
Exports	TOTAL DRY CARGOES						OVERSEAS						WEST INDIES, MIDDLE AMERICA AND CANADA					
	Thousands of Tons	Percentages Carried					Thousands of Tons	Percentages Carried					Thousands of Tons	Percentages Carried				
		American		Foreign				American		Foreign				American		Foreign		
		S. B.	Ind.	British	Other			S. B.	Ind.	British	Other			S. B.	Ind.	British	Other	
1921	Total	34,955	33		67	30,784		29		71		4,071		58		42		
1922	Total	29,064	27	12	30	25,678	25	7	32	36	3,386	6	48	17	29			
1923	Total	31,225	21	11	30	26,198	24	4	33	39	5,027	2	46	18	34			
1924	Total	32,646	20	12	31	27,506	23	5	33	39	5,120	-	47	20	33			
1925	Total	32,556	17	12	32	26,079	21	5	33	41	6,477	-	39	29	32			
1926	Total	47,985	11	10	39	44,145	13	5	41	41	5,840	-	43	22	35			
1927	Total	33,704	16	14	30	28,792	21	8	31	40	5,612	-	43	23	34			
1928	Total	32,207	16	16	29	26,540	19	11	30	40	5,667	-	40	24	36			
1929	Total	32,253	14	18	29	26,723	17	13	30	40	5,530	-	41	24	35			
1930	Total	25,997	12	19	28	21,566	15	14	29	42	4,451	-	38	27	35			
1931	January	1,759	11	21	16	1,477	13	16	27	44	282	-	44	22	34			
	February	1,638	14	22	24	1,402	16	18	24	42	236	-	46	22	33			
	March	1,675	14	22	23	1,374	17	15	24	44	301	-	53	21	26			
	April	1,726	14	20	21	1,478	16	16	22	46	248	-	47	17	36			
	May	1,795	14	10	25	1,461	17	16	24	43	334	-	35	31	34			
	June	1,770	13	18	29	1,492	15	16	23	46	278	-	34	32	34			
	Total	10,363	13	21	24	8,684	16	16	24	44	1,679	-	43	25	32			
Imports and Exports (Combined)	TOTAL DRY CARGOES						OVERSEAS						WEST INDIES, MIDDLE AMERICA AND CANADA					
	Thousands of Tons	Percentages Carried					Thousands of Tons	Percentages Carried					Thousands of Tons	Percentages Carried				
		American		Foreign				American		Foreign				American		Foreign		
		S. B.	Ind.	British	Other			S. B.	Ind.	British	Other			S. B.	Ind.	British	Other	
1921	Total	47,212	36		64	37,079		31		69		9,533		55		45		
1922	Total	49,894	19	15	31	39,181	22	8	35	35	10,673	7	43	16	34			
1923	Total	54,275	17	14	29	40,904	22	6	32	40	13,371	2	40	19	39			
1924	Total	54,520	16	16	30	40,974	21	8	32	39	13,546	-	40	23	37			
1925	Total	57,459	13	16	31	41,069	18	8	32	42	16,390	-	33	29	38			
1926	Total	75,316	10	14	35	59,808	13	8	38	41	16,508	-	35	27	38			
1927	Total	59,065	14	18	29	43,163	19	12	29	40	15,902	-	35	28	37			
1928	Total	58,503	12	19	29	42,782	17	14	29	40	15,721	-	34	27	39			
1929	Total	61,320	11	21	29	44,622	14	17	29	40	16,698	-	32	29	39			
1930	Total	51,458	9	22	29	40,387	12	18	29	41	13,329	-	31	31	38			
1931	January	3,313	8	22	26	2,648	10	19	26	45	670	-	34	28	38			
	February	3,061	10	23	23	2,380	14	19	23	44	681	-	37	21	42			
	March	3,528	10	24	21	2,645	13	20	22	45	883	-	37	19	44			
	April	3,387	10	23	23	2,613	14	19	22	45	774	-	37	22	41			
	May	3,424	11	24	25	2,605	14	20	24	42	877	-	34	28	38			
	June	3,567	8	21	26	2,606	11	17	25	47	961	-	33	29	38			
	Total	20,285	9	23	24	15,739	13	15	23	45	4,846	-	35	25	40			

GAV-RMS

UNITED STATES SHIPPING BOARD,
BUREAU OF RESEARCH, Feb. 29, 1932.

The above table, extracted from tabulations published recently by the Bureau of Research of the United States Shipping Board, illustrates very graphically how the fleets of Japan and of the continental European nations are taking business away from both American overseas ships and the overseas ships of the British. This is particularly true in the classification of dry cargoes overseas, wherein the percentage of American cargoes carried in foreign bottoms other than British is greater than the percentages of such cargoes carried in the combined independent American and British fleets. In this table there is considerable food for thought and material for study on the part of American shipowners and American legislators.

Pumps for Marine Service

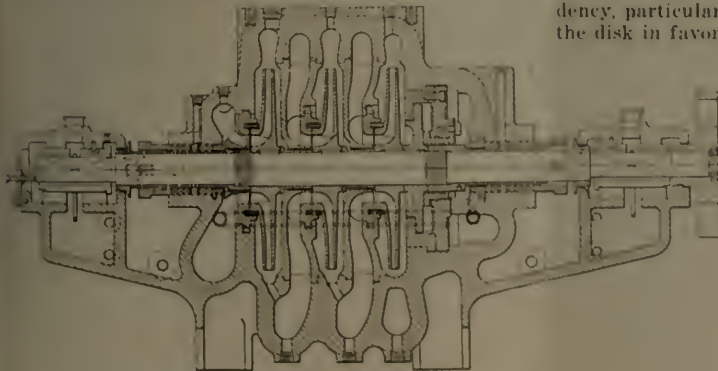
By I. W. Jackman,* O. H. Dorer, H. M. Chase**

Part IV.—Main Feed Pumps

BOILER feed pumps are primarily multi-stage pumps of high speed. They are usually operated as single units not paralleled with other pumps. They may be supplemented by direct-acting feed pumps of 25 to 30 per cent. of the centrifugal capacities for port feed and for auxiliary feed. The thrust problem of high-pressure feed pumps, plus the stuffing box difficulty with high pressures and shaft speeds, has led to a sacrifice in efficiency to avoid these difficulties. In other words, by introducing a "breakdown pressure joint" within the pump—whereby pressure is avoided at the stuffing box and a measure of hydraulic balance against end thrust is secured at the same time—the pumps become mechanically satisfactory and reliable. Such pumps are, of necessity, of the single suction impeller type having a single leakage joint, and expose more back wall surface to pressure than the opposed front wall surface presents. Thus each impeller is hydraulically unbalanced for thrust by an amount equal to the excess back wall surface over front wall surface and the specific stage pressure. The total thrust is greater than the individual impeller thrust by the number of impellers used. The counteracting thrust balancing device acts in the opposite direction and functions on the full pump pressure. Naturally, the device must rotate with the shaft through which the counteracting forces work, and, as it is a rotating disk or drum, it has a leakage joint where it co-acts with the stationary element. This leakage joint has full pumping pressure on it, and, as it leads to the suction chamber of the pump,

wire-draws the water at a very high velocity. In a small pump it is not unusual for the leakage to amount to 10 per cent. of the useful output. Thus the pump would operate at 90 per cent. of its possible efficiency were practical problems not present in the form of stuffing boxes, etc. There is some compensation, however, in that only one leakage joint per impeller exists, whereas there are usually two; but it is not fully compensated because the pressure is greater than the individual impeller leakage joint pressures. Some manufacturers prefer to use a rotating disk having a radial rubbing joint which is prevented from contacting by the film of water passing between the surfaces. There is no question that minimum leakage results from this device because the disk adjusts itself to film thickness. However, the disk is very large—almost as large as the impeller—and its rotation through the water causes considerable friction that consumes power. Again, the amount of thrust balancing is not of a constant nature and permits some mechanical contact at times, particularly if the disk is slightly out of true or the shaft whips. There seems to be no difference in net efficiency between the disk type and the straight drum type. The one leaks less water but consumes more power than the other. There is a strong tendency, particularly with the high pressures, to discard the disk in favor of the drum and provide an external

Manager, Marine Sales, Worthington Pump and Machinery Corp.
Paper read at Annual Meeting of the Society of Naval Architects and Marine Engineers, November 19 and 20, 1931



The upper illustration on this page shows a section through a 4-stage centrifugal feed pump with drum-type balancing device. The lower illustration shows a section through a 3-stage centrifugal feed pump with disk-type balancing device. According to the authors of this paper, there is a strong tendency in favor of the drum type for high pressure work.

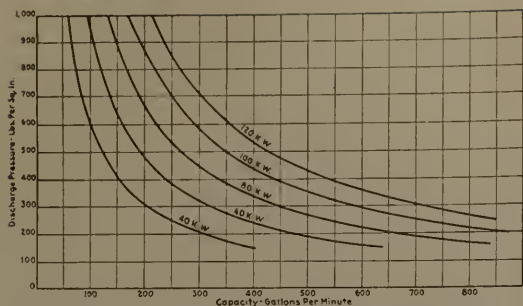


Chart showing electric power in kilowatts required at the switchboard for driving reciprocating feed pumps with double reduction gear.

mechanical thrust bearing capable of taking the variable load and position the rotor properly. If the disk wears away, the rotor shifts, and other reactions may be set up to pyramid the wear condition. Also, there is the danger that the rotating impellers may contact some other internal part. The outside thrust bearing overcomes these troubles.

By referring to Fig. 2, in Part II, and multiplying the head by three or four (the number of stages), the efficiency of boiler feed pumps may be obtained. However, these efficiencies must be multiplied by a factor of from 0.85 to 0.95 because of the balance drum or disk leakage feature as previously mentioned. The exact factor varies with the size of the pump and number of stages.

Occasionally, a single-stage high-speed turbine-driven pump is used as a single unit, and good service may be secured if it is well built and provided with bearings and lubricating devices measuring up to high speed re-

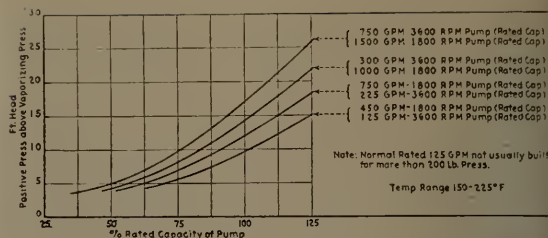


Chart showing suction head necessary for feed pump with varying temperature, capacity, and revolutions per minute.

quirements. Such pumps may operate up to 6000 to 7000 revolutions per minute and have an extremely poor pump efficiency but high turbine efficiency, thus netting a fair over-all efficiency. These pumps are prone to create hydraulic surges of pressure and require extremely good governors. Their characteristic pressure-capacity curve is particularly flat and tends to drop at zero discharge. Another feature of high stage pressures is that as stage pressure increases the efficiency is reduced more and more. It has been noted on a 500-gallons per minute pump operating at 200 pounds pressure and 70 per cent. efficiency that the efficiency drops to 50 per cent. at 500 pounds pressure. This probably comes from power-consuming eddy currents reaching excessive values as the stage pressure increases.

Because of high operating speeds, centrifugal feed pumps should never be built vertically. These pumps are of vital importance to a ship and must receive some concessions in space requirements, where accessibility is desirable. With a direct-current motor of 3500 revolutions per minute limited to about 125 horsepower, only small pumps can be motor driven. Thus, a 400-pound pressure requirement could not result in more than 175 to 225 gallons per minute capacity and from 50 to 60 per cent. efficiency. With 150 to 200 pounds pressure, a two-stage pump may show from 60 to 65 per cent. efficiency at these same rates of flow.

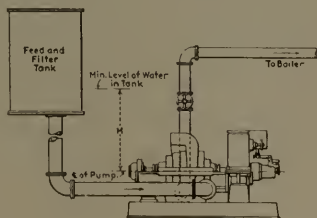
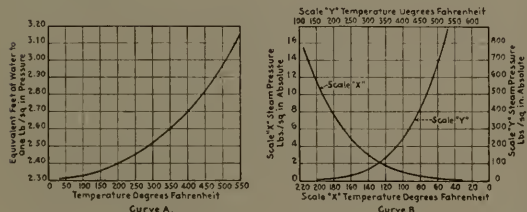
The regulation of motor-driven feed pumps presents some problems. The usual small pump has little pressure change at constant speed between zero and normal flows, so that the change in pressure for actuating any regulating device is of small magnitude. The same remarks apply to turbine-driven pumps. Whenever multiple pumps are operated in parallel with automatic pressure or capacity regulating devices, some manual control is required at some capacities. We wish to emphasize particularly that constant speed operation of centrifugal feed pumps, with automatic or manual throttling of the discharge, is the only safe and reliable means of control, particularly for parallel operation of pumps.

The economical use of centrifugal pumps for boiler feed service is limited by the pressure. The higher the pressure, the higher is the lower limit of capacity. A pump working against a pressure of 400 pounds gauge is limited to a minimum capacity of about 200 gallons per minute. For the small capacities and high pressures, the reciprocating pump is preferable.

Reciprocating Feed Pump

For boiler feed service, there are two types of pumps which may be considered, the direct-acting steam pump and the motor-driven reciprocating power pump.

Except for large steamships and motorships, the direct-acting steam pump was for years the standard equipment. The present high-pressure steam installations and the possibility of greater economy of oper-



NOTE

P_s = absolute pressure in feed tank (transposed to feet of water by Curve A).

P_b = absolute boiling pressure of water in feed tank (pressure equivalent to temperature is taken from Curve B and by using factor from Curve A converted to feet of water).

H = Actual static difference in elevation between pump centerline and minimum water level in feed tank.

H_f = friction losses between feed tank and pump.

$P + H - P_b - H_f$ = net effective head on pump suction.

EXAMPLE To find the net effective suction head on the pump for 300° F. water, 57 pounds per square inch gauge pressure in the feed tank, 10 feet actual static and 3 feet friction loss between the feed tank and pump. From curve A 2.52 feet of water at 300° F. is equivalent to one pound per sq. in. P therefore is $2.52 \times (57 + 14.7) = 181$ feet. P_b from curve B, scale Y, at 67 pounds per sq. in. (absolute, or $2.52 \times 67 = 169$ feet. The net effective head on suction, $P + H - P_b - H_f = 181 + 10 - 169 - 3 = 19$ feet.

*For Reciprocating Power Pump H = difference in elevation between the discharge valves of the pump and the minimum water level in feed tank.

†For Reciprocating Power Pump H_f should include the weight of the suction valve and the resistance of valve spring in feet head per square inch of valve area. This will usually amount to 2.5 to 3 feet.

Chart, diagram, and example showing method of determining net effective suction head for a feed pump installation.

ation have led to the application of the reciprocating power pump. The practically continuous service of the main feed pumps results in a total operating saving sufficient to warrant the increased initial cost. Port feed pumps on passenger and cargo ships would come in the same classification as main feed pumps. The percentage of operating time for auxiliary feed pumps is so small that the lower cost of the direct-acting steam pump offsets the better efficiency of the motor driven power pump.

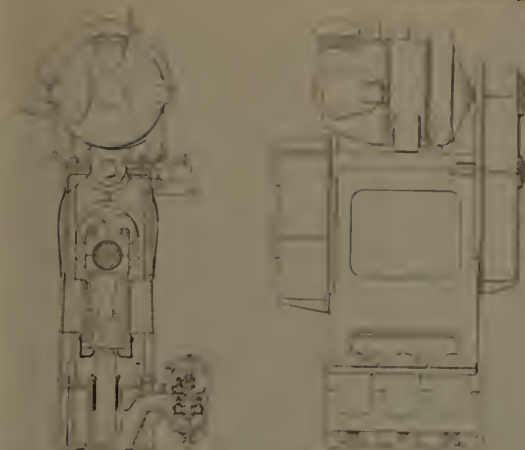
Thus, each type has preference under certain conditions; viz, for emergency or standby service, the direct acting steam pump; for regular service, small and medium capacities and high pressure, the reciprocating power pump; for regular service, large capacities and low, medium or high pressures, the centrifugal pump.

The direct-acting steam-operated boiler feed pump is familiar to all marine engineers. Its low cost, small floor space requirement, and ease of regulation are desirable features. It is, however, not economical in operation. Its steam consumption will vary with operating conditions, but probably is not lower than 70 pounds of steam per water horsepower per hour under favorable conditions.

The steam pump is available in sizes up to 21 x 14 x 27 vertical simplex, good for capacities of approximately 800 gallons per minute. It is probable that this size will not be exceeded, as the centrifugal pump will handle the large capacities more economically. With present construction, the steam pressure for the direct-acting steam pump is limited to about 450 pounds. The higher steam pressure and superheat preclude the use of cast iron steam cylinders. Steel steam cylinders with cast iron liners are being developed for such service.

The motor-driven reciprocating power pump offers a high efficiency, in the neighborhood of 75 to 90 per cent. in the larger sizes. If the motor derives its current from a generator driven by a turbine having a water rate of 10 pounds per horsepower per hour, the steam consumption necessary to drive the feed pump, allowing usual losses in generator, motor, switchboard and wiring, would approximate 15 pounds per water-horsepower per hour. This is compared with 70 pounds per water horsepower per hour for the direct-acting steam pump. Steam and exhaust piping are eliminated for the power pump.

The current required for operation depends upon the capacity, pressure, and efficiency of the pump, and the electrical losses in the motor, switchboard, and wiring. The pump efficiency and the electrical losses are af-



Section and side elevation of vertical triplex reciprocating main feed pump driven by electric motor through mechanical gearing.

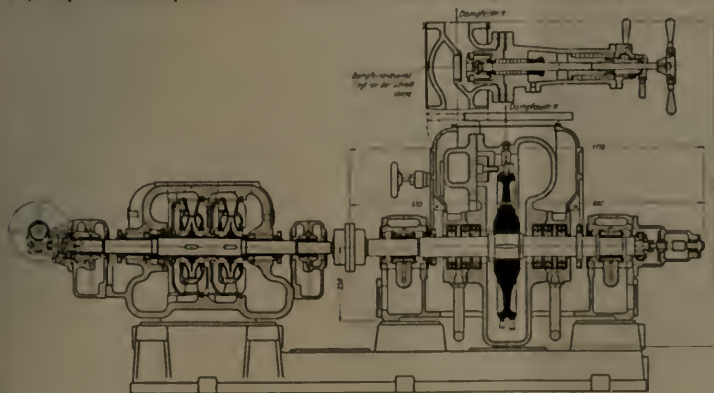
ected by the size of the unit; the smaller units are somewhat less efficient than the larger ones.

The only limitation to the use of the reciprocating power pump is where it becomes too cumbersome and expensive. The motor, mounted above the pump, requires rigid frame work to support its weight and maintain alignment of shafts and gears. A pump requiring a 150-horsepower motor is probably the largest size that is desirable.

Due to the comparative low speed of the pump—100 revolutions per minute maximum—a considerable gear ratio is involved if a high-speed motor is used. The motor should be limited to a maximum speed of 1,750 revolutions per minute.

There are two types of reciprocating power pumps adaptable to this service. The horizontal duplex double-acting piston pattern enclosed crankcase pump has been used in some installations and has given satisfactory service.

The vertical single-acting outside packed plunger triplex is preferred on account of smaller floor space, less slip, and more uniform discharge flow. In either case, a variable speed motor is mounted on the pump frame. The capacity is controlled by a differential pressure regulator operating a rheostat which varies the speed of the motor according to feed requirements. In case the volume required is below the range of the speed control, an automatic by-pass valve in the discharge line returns the excess water pumped back into the suction line. This type of regulation is possible only because the equivalent pressure-capacity characteristic is extremely steep as compared to the centrifugal pump commented on above.



Section through a turbine-driven 2-stage main feed pump of the German type as installed on the express liner Bremen.

European Gateways for Pacific Coast Exports

*A Series of Sketches Covering Continental European Ports
and the Pacific Coast Services Based on Those Ports*

II. Hamburg and HAPAG

THE great Charlemagne, building castles along his slavic frontiers in the year 808, located a castle on the Alster River near its confluence with the Elbe, naming the site Hammaburg. For three hundred years Hammaburg had a very precarious existence. Danes, Slavs, and Frisians, pirates, politicians, and prelates all took turns in raiding, looting, and burning. Finally in 1110 the town came into the possession of the Counts of Schauenberg, a family who had some ideas of strong constructive government.

Successive generations of Schauenbergs obtained for the City: Right of separate court and jurisdiction; freedom from tolls to the mouth of the Elbe; rights of fishing in the Elbe; alliance with Lubeck, forming basis of Hanseatic League; constitutional government for the city; and the complete defeat of Frisian pirate confederation harassing mouth of the Elbe.

Up to the Sixteenth Century, Hamburg was on the Alster with the mouth of that river and adjacent portions of the Elbe serving as its port. In the Sixteenth Century, Lutheran doctrines and engineering schemes seem to have firmly taken possession of the city. At any rate, from 1529 to 1860 the policy was exclusively Lutheran and the engineering was marvelous. A city waterworks was erected in 1531; artificial and natural changes were made to improve the bed of the Elbe River; channels and canals for lighters were cut through the lowlands between the old town and the Elbe; the waterways were gradually brought to their present condition.

Notwithstanding her great age, Hamburg has very few old landmarks, because in 1842 the older part of the city was practically wiped out by a great fire that completely destroyed 4219 buildings.

Hamburg, down to 1867, was a free and independent

city-state. In that year, uniting with the North German Federation, later the German Empire, she retained her rights as a free port. In 1865 the merchant marine flag of the city-state of Hamburg was carried by 530 seagoing merchant vessels, with a combined capacity of 178,605 tons burden. In those days that flag was a frequent visitor to the Port of San Francisco.

The modern port of Hamburg is a series of basins with free access to the river and boasts of: Over 30 miles of quay berthing space, served by 230 miles of port railroad trackage and 2000 cranes, ranging from one to 250 tons capacity and all electrically operated; 800,000 square yards of covered transit shed area with a total length of 12 miles; ample refrigerated and ordinary warehouse capacity conveniently located to the quays; adequate inland waterway, highway, and railroad connection to all central European markets; and the world's best facilities for designing, building, and maintaining ships. In Hamburg shipyards were built the two largest merchant ships afloat, Majestic and Leviathan, and the world's fastest merchant ship, Europa.

Hamburg-Amerikanische - Packetfahrt-Actien-Gesellschaft (HAPAG for short) has always been in modern times the greatest of Hamburg's shipowning and operating firms. Founded in 1847, HAPAG: established regular connection between Hamburg and New York, with three sailing ships; added two steamers (bark rigged, 12 knots) in 1856; grew to 20 steamers making 126 round trips in 1885; annexed Albert Ballin in 1886. Ballin built up business and fleet until, in 1914, HAPAG: owned 194 ocean steamers and 254 coast and harbor craft aggregating 1,360,360 gross tons; operated 74 routes serving over 400 world ports. This fleet in-



Reproduction of an old photograph taken about 1865 showing two of the first Hamburg-American Line steamers at a river dock. Note the large fleet of sailing vessels in the background, moored in the river.

cluded largest and finest ships afloat. HAPAG was acknowledged the greatest merchant steamship enterprise in the world.

World War in 1914 closed all HAPAG offices outside of Germany and all floating equipment was seized, interned, or commandeered.

The rebuilding of this great enterprise since the close of the war is an epic in modern business method. The whole story would fill many volumes. A worthy successor to Albert Ballin was found in Dr. Wilhelm Cuno and he, with his associates, achieved the seemingly impossible. Left with practically nothing, HAPAG in ten years built up a fleet of 168 seagoing ships and 267 other craft, aggregating a tonnage of over a million gross measurement, with passenger and freight services over 40 routes, touching over 500 world ports. The figures are for 1929. To-day they would be considerably higher and HAPAG is still building.

In an operating agreement with the North German Lloyd, HAPAG participates in a joint passenger and freight service between Pacific Coast ports and North European ports via Panama, with sailings every ten days. From San Francisco to Hamburg, the usual time is 28 days and many passengers enjoy this delightful sea trip. All of the HAPAG vessels on this route have large refrigerated cargo capacity for handling fresh fruits and other Pacific Coast products.

Principal commodities eastbound are: Oregon pine, cedar, and redwood lumber, lumber products, and cedar logs; apples, fresh and dried; canned salmon; pears, fresh, dried, and canned; dried prunes; raisins; citrus fruits; canned vegetables and other food products; wheat and flour; petroleum and its distillates.

Principal cargo westbound consists of manufactures and chemicals. Although neither the value nor the volume of the westbound traffic in this direct European route is at all comparable to the eastbound cargo, which makes the route especially difficult, nevertheless HAPAG maintains on this line that high standard of personality, comfort, and service which has characterized Hamburg-American service for over eighty years.

The port of Hamburg, during the reconstruction period following the late war, maintained its leadership in modern port engineering and is still very much of a mecca for students of port management and port



Hamburg-American Line motorship unloading Pacific Coast products at the HAPAG dock, Hamburg.

construction. Located at this port is the greatest hydraulic laboratory in the world. This laboratory offers ideal facilities for the study of harbor channel conservancy; and through the results obtained from such studies the management of the Port of Hamburg has been able to effect very considerable savings and to maintain low costs for discharging and loading vessels.

New Bridge at Portland

Our frontispiece shows the recently completed suspension bridge across the Willamette River at Portland, Oregon, built by Multnomah County to join the upper and lower Columbia River highways. This bridge cost \$4,250,000. It is carried on stranded cables, fabricated and erected by the John A. Roebling's Sons Co. An interesting feature is that the eastern cable pier rests on a foundation composed of 1058 Douglas fir piles.



An interesting contrast with the view on the opposite page is afforded by this recent photograph of the dock basin at the HAPAG docks in Hamburg showing a number of large modern liners handling freight to and from piers and to and from lighters. The Port of Hamburg is more plentifully supplied with cargo cranes than is any other port in the world. There are always from two to three shore cranes per hatch available.

Stockton's Channel and Port

Aerial view of turning basin at head of Stockton's deep-water channel. Suction dredge in mid-stream. Construction is now underway on 580 lineal feet of open wharf and 920 lineal feet of covered transit sheds adjacent to turning basin. A municipal belt line railway and concrete highways will serve docks and industrial area nearby.



Proving the old axiom that a straight line is the shortest distance between two points, giant dredges cut across the peat lands of the Delta to tame the curves of the San Joaquin.

San Francisco Bay

Preparing for New Commerce

III. Port of Stockton

THE City of Stockton, located on the San Joaquin River, ninety miles inland from the Golden Gate, is one of the pioneer ports of California. In the days of '49, it served as a distributing point for many of the mining districts and at that time had sufficient depth of water in the river channel to accommodate most of the vessels entering San Francisco Bay. Many a deepsea sailing vessel ran up the San Joaquin to that frontier settlement. Indeed, the records of Congress disclose a resolution offered by a California representative in 1851 to make appropriation of federal funds to widen the western approach to Stockton channel for a distance of five miles. At that time it was estimated that the corkscrew bends of the river could be suitably modified for navigation at an expense of only ten thousand dollars. The first appropriation by the federal government for improving the river channel was made in 1876. Since that time, both Stockton and the United States Government have spent large sums in maintaining a 9-foot depth on a 200-foot width at all seasons.

After much effort, interrupted by the late war, the City of Stockton and the United States Government, in the 1926 Rivers and Harbors Act, finally came to complete agreement for a \$6,000,000 program of harbor and channel improvement, the State of California furnishing an additional \$419,000 for the purchase of rights of way. This plan calls for a channel 28 feet deep, 300 feet wide at the surface, and 100 feet wide at the bottom, with passing basins of double width every five miles and with a minimum radius of 5000 feet on all channel curves; a turning basin at Stockton; and 1200 lineal feet of wharves and 800 feet of terminal shed.

Work on this project is now nearly 75 per cent. completed and at the present rates of progress, Stockton should once more be a deepsea port before the year is out.

Always since its pioneer days a concentration and distributing point, Stockton has much to offer both the shipper and the ship. On the existing 9-foot channel, river cargo volume to and from the Stockton district has run over a million tons in a single year, with a value of over 56 million dollars. The deep water channel and the advent of ocean going ships will undoubtedly stimulate a much greater volume of waterborne traffic by the elimination of transshipment costs.

Stockton is determined to put her best foot forward in securing all the advantages possible. She is actively canvassing manufacturers to locate at a site boasting: ample areas of flat lands on deep fresh water, connecting to the seaways of the world; adequate connections to four great transcontinental railway systems; an immediate hinterland of great extent unrivalled for the variety and value of its agricultural, horticultural, and mineral products.

Ultimate plans for the harbor of Stockton, as now laid out and approved, call for dockage facilities to handle 28 large ocean-going steamers simultaneously.

All the port work at Stockton is under the supervision of Colonel B. C. Allin, formerly director of the Port of Houston, Texas, and a nationally recognized authority on harbor development and operation.

Export Cargoes in Fibreboard Cases

IV. Educational and Service Work of E.F.C.A.

A FEATURE added to the regular Educational and Service work in the United Kingdom and Continental Europe this year by the Export Fibreboard Case Association of San Francisco is the use of moving pictures. The association has made about two thousand feet of film showing methods and practices for handling EFCA fibreboard cases in the cannery, packing house, warehouse, and along the waterfront at various ports in the United States. These pictures will be shown abroad to buyers, warehousemen, longshoremen, and overland carriers both rail and motor.

Representatives will carry portable projectors which will enable them to show the pictures anywhere and at any time, providing there is ordinary electric light power available. The projectors used are the most modern, compact, business type and they do not require special screens or any unusual facilities or darkened room. With this special equipment the pictures may be shown on the desks in offices of buyers and others and as a supplement to the interviews which EFCA men are constantly making on behalf of exporters.

The Export Fibreboard Case Association, financed entirely by its member manufacturers, was organized to carry on export shipping research, establish and police necessary standards, and to educate buyers abroad as well as aid in claim prevention.

EFCA fibreboard cases are fabricated to meet definite, fixed quality standards built up by actual export shipping experience. The EFCA trade mark is controlled by license agreement which insures that the container upon which the trade mark is used is approved for export shipment of the product which it contains. By this symbol it is quick and easy for quay receiving clerks to identify EFCA cases as a sufficient container. By this means of identification steamship managements are, without cost or expense to themselves, provided a standardized gauge for fibreboard cases for export.

Just as the "White Fireman" symbolizes the fire prevention work on behalf of the insurance companies and the "approval label" marks the electrical apparatus passed by the Board of Fire Underwriters, so the EFCA service men labor toward claim prevention and the EFCA trade mark identifies the seaworthy fibreboard shipping case.

The Star Spangled Banner

Its Genesis, Its History, and Some Rules for Its Use on Shipboard

BEFORE the Declaration of Independence, the flags of those colonies which later formed the United States of America were various. By the year 1700 most of the Colonies had devised banners to distinguish their vessels from those of England and from each other. Thus, Massachusetts bore a Pine Tree, South Carolina displayed a Rattle Snake, New York had a white flag with a blue Beaver, Rhode Island a white flag with a blue anchor upon it. In 1775 a committee was appointed to consider the question of a single flag for the 13 States. This committee was composed of three members, of which George Washington was one, Robert Morris and a George Ross, the husband of the famous Betsy Ross, were the others. On the 14th of June, 1777, which date is now observed as Flag Day throughout the United States, Congress resolved, based upon the recommendation of this committee: "that the flag of the United States be 13 stripes, alternate red and white; that the Union be 13 stars, white in a blue field, representing a new constellation." Advocates of Washington hold that the Stars and Stripes were suggested by the coat-of-arms of the Washington family, which was a white shield having two horizontal red bars and above these a row of three red stars. This might, by a stretch of the imagination, be supposed to have inspired the original design of the flag. In any event, this is the historical story of the origin of the flag in its original form, to which has been added an additional star for each state as it was added to the Union.

The story of the making of the first flag by Betsy Ross is a picturesque tradition; and it is true that Mrs. Ross was a seamstress, who occasionally made flags, and wife of one of the members of the original flag committee, as already mentioned, so that she may very naturally have sewn the first flag. There is also another story—how less than three weeks after Congress had authorized the flag design, a group of girls in Portsmouth, New Hampshire, at an improvised "flag-bee" made for Captain John Paul Jones, the dashing young naval hero in command of the *Ranger*, the beautiful *Star Spangled Banner* which he hoisted over his vessel on July 4, 1777, the first United States flag to be thrown to the breeze from a ship's staff, and how in making this flag the girls had used pieces of their best silk dresses, the white stripes being cut from the bridal gown of one of the girls, a bride of only a few months. Some writers claim that this *Ranger's* flag was the one that afterwards flew from the *Bon Homme Richard*, in that most thrilling sea fight of history.

A month after the *Ranger's* flag was first hoisted, on August 3, 1777, to be exact, the new national emblem went under fire for the first time at Fort Mifflin, which stood on the site of the present city of Philadelphia, New York, during an attack by British and Indians. This flag was made on the spot, one story being that soldiers' shirts furnished the cloth for the white stars and stripes, the red stripes were made from a red petticoat belonging to the wife of one of the privates, and

the blue cloth coat of Captain Abraham Swartwout supplied the material for the blue field of the Union.

The first official salute to the "Stars and Stripes" was given on February 14, 1778, and it was fitting that France, who aided in our fight for independence, should do this. The occurrence was in Quiberon Bay on the French Coast, when the *Ranger*, under the command of John Paul Jones, was saluted by the French Fleet under Admiral LaMotte Picquet.

With the admission of two more states into the Union, Vermont in 1791 and Kentucky in 1792, an act of Congress effective May 1, 1795, increasing the number of stars and stripes from thirteen to fifteen. This was our national flag for the next twenty-three years and was carried in three wars for the maintenance of the rights of American citizens—in the suppression of French privateers, 1798-1800; against the pirates of Tripoli, 1801-1805; and with Great Britain, 1812-1815. Waving triumphantly over Fort McHenry amid the shot and shell raining down from a heavy British bombardment. September 13, 1814, this flag of fifteen stars and stripes inspired Francis Scott Key to write "The Star Spangled Banner," America's national anthem.

Francis Scott Key, a young American lawyer, had been detained on board an enemy ship where he had gone to seek the release of a friend held prisoner. Throughout the long night, he anxiously watched the bombardment of Fort McHenry, Baltimore's defense, and when morning dawned he saw the Stars and Stripes still proudly flying over the fort. This flag, the original "Star Spangled Banner," has been repaired by expert needlewomen and is preserved in the Smithsonian Institution at Washington.

As more and more States were constantly being admitted to the Union, it became necessary again to readjust the flag. The original intention had been to add a new stripe and a new star for every new state, but the impossibility of this soon became evident. On April 4, 1818, the following law was passed by Congress: "Be it enacted, . . . That from and after the fourth day of July next, the flag of the United States be thirteen horizontal stripes, alternate red and white; that the union have twenty stars, white in a blue field. Be it further enacted, That on the admission of every new State into the Union, one star be added to the union of the flag; and that such addition shall take effect on the fourth of July next succeeding each admission." Twenty-eight States have been admitted since 1818 (five States had been added previously), so that our flag now contains forty-eight stars.

Each State is represented by a certain star. Beginning in the upper left-hand corner and reading each row from left to right, the star of each State appears in the order of the State's ratification of the Constitution and admission to the Union, as follows:

Del.	Pa.	N. J.	Ga.	Conn.	Mass.	Md.	S. C.
N. H.	Va.	N. Y.	N. C.	R. I.	Vt.	Ky.	Tenn.
Ohio	La.	Ind.	Miss.	Ill.	Ala.	Me.	Mo.
Ark.	Mich.	Fla.	Tex.	Iowa	Wis.	Calif.	Minn.
Oreg.	Kans.	W. Va.	Nev.	Nebr.	Colo.	N. Dak.	S. Dak.
Mont.	Wash.	Idaho	Wyo.	Utah	Okla.	N. Mex.	Ariz.

The dimensions of the flag were fixed by an executive order, dated May 29, 1916. Its length should be 1.9 times its height. The union, or part of the flag on which the stars appear, should be seven stripes high and its length 0.76 of the height of the flag. The stars are five-pointed, with one point directly upward.

While it is within the province of the War Department to prescribe rules and regulations governing the use of the flag for observance within the various units of our combat forces, yet it is beyond its province to prescribe any such rules or regulations for the guidance of civilian organizations. As a result, there is no federal law in force pertaining to the manner of displaying the United States flag or prescribing any ceremonies that should be observed in connection therewith. However, on Flag Day, June 14, 1923, representatives of over 68 national patriotic organizations met in Washington, D. C., for a conference to draft a code of flag etiquette. The rules adopted by this conference represent the opinions of patriotic organizations following the rules prescribed for the Army and Navy and consequently represent an authentic guide which every American should be proud to follow.

Rules for Use of Flag on Shipboard

The following rules are taken from the results of the conference mentioned in the preceding paragraph and are quoted where they might be applicable to our vessels:

1. In general the term "flag" is used regardless of size, relative proportions, or manner of display; but three other terms have certain well defined usages of long standing, as follows:
 - (a) "Color" is a flag carried by unmounted units.
 - (b) A "standard" is a flag carried by mounted or motorized units.
 - (c) An "ensign" is a flag flown on ships, tenders, launches, and small boats.
2. The halyard of all ensigns shall be equipped with a canvas tabling with grommets or flag staples, or both.
3. The National Ensign on board a ship at anchor shall be hoisted at 8:00 A.M. and kept flying until sunset, or between such hours as may be designated by proper authority. Whenever a ship comes to anchor or gets under way, if there is sufficient light for the ensign to be seen, it shall be hoisted, even though earlier or later than the time specified. Unless there are good reasons to the contrary, the ensign shall be displayed when falling in with ships of war of any country as hereinafter explained, or when approaching the land and especially when passing or nearing forts, light-houses, or towns.
4. The National Flag should always be hoisted briskly and lowered slowly and ceremoniously.
5. When flags of states or cities, or other special pennants are flown on the same halyard with the Flag of the United States, the National Flag should always be at the peak. When flown from adjacent staffs, the Flag of the United States should be hoisted first. No flag or pennant should be placed above or to the right of the Flag of the United States.

Note: In the Navy there is an exception to this rule. The church pennant, which is flown during divine service on shipboard may be flown above the National Flag. This is the practice in all the navies of the world.

6. When used to cover a casket, or corpse prepared for burial at sea, the Flag should be placed so that the Union is at the head and over the left shoulder. At a burial at sea care should be taken to use the flag of the country to which the deceased owes allegiance. The Flag should not be lowered into the sea, but should be removed when the body is "committed to the deep."
7. The National Ensign should never be allowed to touch the ground or deck, and should always be treated with reverence and respect.
8. When flown at half staff, the Flag is first hoisted to the peak and then lowered to the half staff position. Before lowering the Flag for the day it is first raised again to the peak. On Memorial Day, May 30, the Flag is displayed at half-staff until noon, and at full-staff from noon till sunset.
9. When meeting naval vessels of any nation at sea, and particularly those of the United States, the Flag is dipped as a courtesy salute. The proper procedure in such cases is as follows:
 - (a) Immediately upon sighting a man-of-war, the Flag is run up and broken out.
 - (b) When the two vessels are sailing along diverging paths, at the point of nearest approach, provided the flags of both vessels are visible, the merchantman slowly lowers its flag and keeps it down until the signal is acknowledged by the lowering of the ensign on the warship. The merchant vessel then hoists its flag briskly.
 - (c) Where the two vessels are traveling along parallel courses the same procedure as outlined under letter (b) is followed, this action taking place as the vessels come abeam of each other.
 - (d) The Flag is then left flying until the man-of-war is out of sight, after which it may be lowered and put away.

The Flag of the United States first flew over thirteen colonies along the Atlantic coast, having a population of some 3,000,000 people. Now it waves majestically over 48 states, extending across the continent and flies over many islands of the Atlantic and Pacific, and outlying possessions. More than one hundred and thirty million people owe it allegiance, a vast assemblage composed of nearly every race in the world, but all united by one bond of loyalty and devotion to a flag which symbolizes Liberty and Justice.

Our flag has come triumphant through eight national conflicts. Whether in peace or in war, this glorious banner of ours, so nobly consecrated by the millions of lives sacrificed in its defense, should never fail to inspire in the heart of every American a reverence and allegiance to the high principles for which it stands and a new and abounding faith in the land of the Red, White, and Blue.

[Bulletin, Standard Shipping Company.]

New Type United States Sea Patrol Boats

Seven 16-Knot Diesel-Engined 160-Footers Delivered By Bath Iron Works to Coast Guard Service

THE construction program of patrol boats for the sea service of the United States Coast Guard has now been completed at the Bath Iron Works, of Bath, Maine. Contract for the seven vessels was signed January 21, 1931. First ship, the *Thetis*, was delivered November 27, 1931; last ship was delivered late in April, 1932. All seven have names derived from Greek mythology: *Aurora*, *Daphne*, *Calypso*, *Hermes*, *Icarus*, and *Perseus*. Coast Guard officials will need to brush up on Homer to get the full meaning of this beautiful nomenclature.

General characteristics of these vessels are as follows:

Length over-all	165'0"
Length on water line	160'9"
Length between perpendiculars	160'0"
Beam molded at deck	25'3"
Beam molded at water line	23'9"
Depth molded amidships	13'2"
Draft (salt water)	7'1½"
Displacement, tons	294
Block Coefficient	0.378
Midship Coefficient	0.659
Fresh water tank capacity, gallons	3460
Diesel oil bunker capacity, gallons	7690
Total shaft horsepower	1340
Speed on trial, knots	16

Sections forward are of modified V-type and sections aft of straight V-type, with slightly hollow lower water lines forward and straight lower water line aft. This combination produces easy curves on buttocks and eliminates hollow spots forward, while aft of amidships the buttocks are practically straight below the water line and curve upwards above that line due to the cruiser type stern.

Frames, deck beams, and water-tight bulkhead stiffeners are bulb angles. Bottom and side plating is 12.8 pounds for half length amidships, 10.2 pounds forward and aft. Keel plate and sheer strake are 17.9-pound plate for half length amidships. Keel plate is 15.3 pound and sheer strake 12.8 pound forward and aft. Six water-tight and two oil-tight bulkheads extending from keel to weather deck divide the hull into nine compartments. The weather deck is completely plated with 7.7-pound steel. The berth deck is wood planked on steel deck beams, except in way of galley, which is floored with Alumalum tiles laid on steel plates. Walking flats



Cutter *Thetis*, first of the seven Coast Guard patrol boats to be delivered.

in engine room are of aluminum alloy corrugated plates on steel bars.

Berthing space is provided for five petty officers and 33 enlisted men in two compartments forward on berth deck. A third compartment houses the armory and four warrant officers' staterooms. On this deck also are located the officers' mess, the crew's mess, the galley, the ship's refrigerators, and the heating plant.

In the deck house are located a raised bridge and pilot house forward; the commanding officer's stateroom; the radio room; officers' washroom, shower, and toilet; crew's washroom, shower, and toilet; and access to the berth deck forward, the warrant officers' staterooms, and the engine room.

A steam heating Arco boiler, fitted with Enterprise oil burners and supplying steam to McQuay copper-fin extended-surface type radiators, provides comfort in cold weather. Two Westinghouse automatic electric refrigerators take care of perishable food stores. Stateroom, berthing, and mess spaces are provided with adequate ventilation by three Sirocco Utility Blowers.

Propulsion Machinery

The propulsion plant consists of two 6-cylinder, 4-cycle, airless-injection Winton diesel engines of 14-inch bore and 16-inch stroke, each designed to develop 670-horsepower at 450 revolutions a minute. These units have built-in cooling water circulating pumps; lubricating oil pumps; high pressure fuel injection pumps; and fuel oil transfer pumps. Each unit has a lubricating oil cooler of the Schutte and Koerting shell and tube type and each has its own sea suction valve and overboard discharge connection for cooling water. The electrically operated fire pump is cross-connected with this

circulating system for cooling water so that it can be used as a stand-by in case either or both circulating pumps should fail to function.

Each of the main engines is direct connected to a propeller shaft, and each shaft is fitted with a Kingsbury thrust bearing immediately aft of the engine. The boats are fitted with twin rudders and, in order to minimize strut resistance and turbulence, the after ends of the propeller shafts are carried on bearings in bosses on the forward side of the rudder posts. The rudder posts and rudders are stream-lined. Forward of the propeller the only interference to water run is from the intermediate strut. Bearings in the rudder posts and the intermediate struts are Goodrich Cutless Rubber. Bearings in the stern tubes are of babbit, lubricated by oil. Propeller shafting is fitted with fairwaters adjacent to the strut bearings and the propeller hub to reduce eddy resistance. Struts are single arm type stream-lined. Propellers turn outboard; have 53-inch pitch; 62-inch diameter; and projected area ratio of 0.400. This arrangement has worked out very nicely and apparently greatly minimizes vibration in the stern, a very valuable feature in hulls of light construction.

For electric auxiliary power and for lighting, two 15-kilowatt and one 5-kilowatt Winton-Westinghouse diesel-driven generating sets are installed. The 5-kilowatt set drives also, through clutch connection, a Worthington 2-stage auxiliary air compressor. The main air compressor is a 40-cubic-foot 2-stage Ingersoll-Rand driven by a Westinghouse 12½-horsepower motor. A force feed lubricating system is used for the main engines and, in addition to the reciprocating lube oil pumps built into the engines, two Viking rotary pumps are installed. Both of these pumps are driven by the same motor. Suitable filter tanks and a Hydroil centrifugal oil purifier insure clean lubricant.

A sanitary system supplying salt water under pressure to showers and toilets is served by a Warren single-stage double-suction centrifugal pump driven by a 5-horsepower Diehl motor. Fresh water is circulated by hand pump only.

A Warren 2-stage centrifugal fire pump driven by a Diehl 10-horsepower motor takes suction from a sea valve from the water connections of the lube oil coolers and from the engine room bilge. This pump discharges to overboard, to the fire-main system, to cross connections to sanitary tank, or to main engine cooling water system. Five water jet bilge ejectors are operated from the fire mains.

A Sirocco Utility Blower of 320 cubic feet per minute capacity draws air from the engine room bilges and discharges above the weather deck.

Deck and Navigation Equipment

The battery of these ships consists of one 3-inch 23-caliber anti-aircraft gun and two 1-pounder guns, all located on the forward weather deck.

A Hyde windlass, driven by a 7½-horsepower General Electric motor, is capable of lifting a 900-pound anchor and 45 fathoms of 7 8-inch stud link anchor chain at the rate of six fathoms a minute. Carried on davits, port and starboard, on after weather deck, are two 19-foot dories and two 19-foot 4-inch surf boats. Atop the deck house are two 18-inch incandescent searchlights and one 18-inch high intensity arc searchlight, all supplied by the Sperry Gyroscope Company.

The bridge is equipped with standard compass Kols-

ter radio direction finder, engine room telegraph, engine room speaking tube, engine room telephone, and the steering wheel for the Sperry electric steering gear. This steering gear is an ingenious combination of electric gear drive for power steering and straight mechanical gear drive for hand steering. The steering wheel in the pilot house operates the motor control contactors located in the engine room and can also be used to operate mechanically the drum driving the tiller ropes. Change-over from power to hand steering is automatically made when, for any reason, power is shut off from the steering gear motor. On trials it was difficult for the helmsman to determine whether he was hand steering or power steering on helm angles up to 10 degrees port or starboard.

Trial Data

On trials of the *Thetis*, all machinery, hull, and gear functioned satisfactorily. A speed of 16.067 knots at 457.6 revolutions satisfied the requirements. Later she made 16.555 at 476.8 revolutions, without undue vibration and with every indication that the machinery could stand that pace indefinitely.

She was brought to dead stop from full speed ahead in 50 seconds, within 200 yards of her position when first signal was given. From full speed ahead to full speed astern of engines, elapsed time was 30 seconds. At 16 knots she turned handily in a circle of 200 yards diameter. All of these tests were made at full load displacement.



Three interesting snapshots of the Panama Mail liner *Colombia* breaking up on a reef off the west coast of Mexico. Pictures were taken from the Merritt, Chapman & Scott tug standing by at the time of the wreck. The wreck has now practically disappeared.

A New Diesel-Electric Tug

Interesting Craft with Wrought Iron Hull Built by Spedden of Baltimore for U. S. Public Health Service

AN interesting diesel-electric tug, the Walter Wyman, has recently been delivered by the Spedden Shipbuilding Company of Baltimore, Maryland, to the United States Public Health Service at New York for the quarantine station at Rosebank, Staten Island. This tug, designed by P. W. Clark, naval architect, Washington, D. C., has the following characteristics:

Length, over-all 100' 0"
Beam, over-all 23' 1-7/8"
Depth, molded 14' 2 1/2"
Load displacement, tons

270

Gross measurement, tons 196

Net measurement, tons 133

Unusual features for a tug are—a spacious saloon just aft of the pilot house for the use of doctors and inspectors on their trips to ships in the harbor; a large comfortable lounge on the main deck forward for cabin passengers; a hospital equipped for six patients; and aft a compartment for steerage passengers.

The entire hull below the water line is constructed of Byers Wrought Iron plates and with Ulster wrought iron rivets "for the purpose," in the words of the architect, "of combating corrosion of the vessel's under-water body."

The tug Walter Wyman is equipped with two 5-cylinder, 12 by 15-inch, Fairbanks-Morse diesel engines, each rated 325 brake horsepower at 300 revolutions per minute and each driving, through a flexible coupling, a 205-kilowatt, 25-volt, Westinghouse direct-current generator and a 25-kilowatt, 125-volt Westinghouse exciter. These units supply current to a 500-shaft horsepower, double-armature, Westinghouse motor, direct-connected to the propeller shaft. A No. 17 Kingsbury thrust bearing is fitted just aft of this motor. The motor is equipped for a pilot house



Quartering view of Public Health Service tug
Walter Wyman.

control with a control stand port and starboard.

The propeller is a Columbian bronze wheel, Type N.E., 3-bladed, with 96-inch pitch and 96-inch diameter. At rated full power the motor turns this wheel 175 revolutions per minute and drives the tug at better than 11 knots. On sea trials

the motor developed 557 horsepower, turning the propeller at 180 revolutions per minute and giving a speed of 11.7 knots.

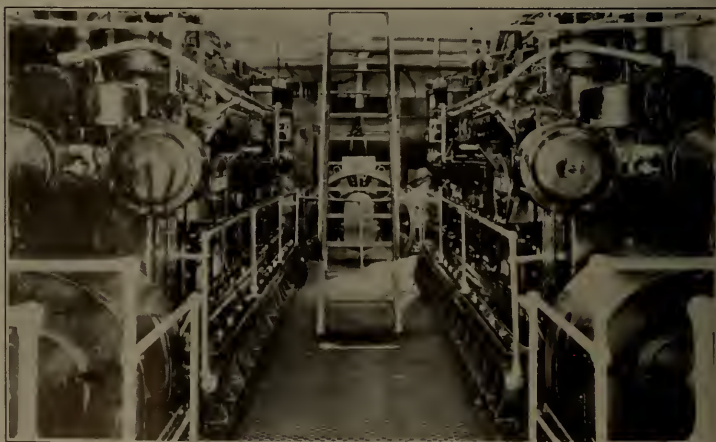
A Fairbanks-Morse combination diesel-driven generator and compressor set of 20 kilowatts capacity furnishes current for auxiliary power and for lighting. All pumps are Fairbanks-Morse, electrically operated.

A Sperry electric steering gear is fitted, equipped with an electric clutch which automatically disengages the electric gear and engages the hand gear in case of any faulty operation of the electric control.

A 3-horsepower Mianus Diesel Engine Company emergency compressor is fitted as a standby for emergency starting of the 20-kilowatt unit.

An Arco boiler supplies hot water for heating all quarters. This unit is especially equipped to burn diesel oil fuel economically.

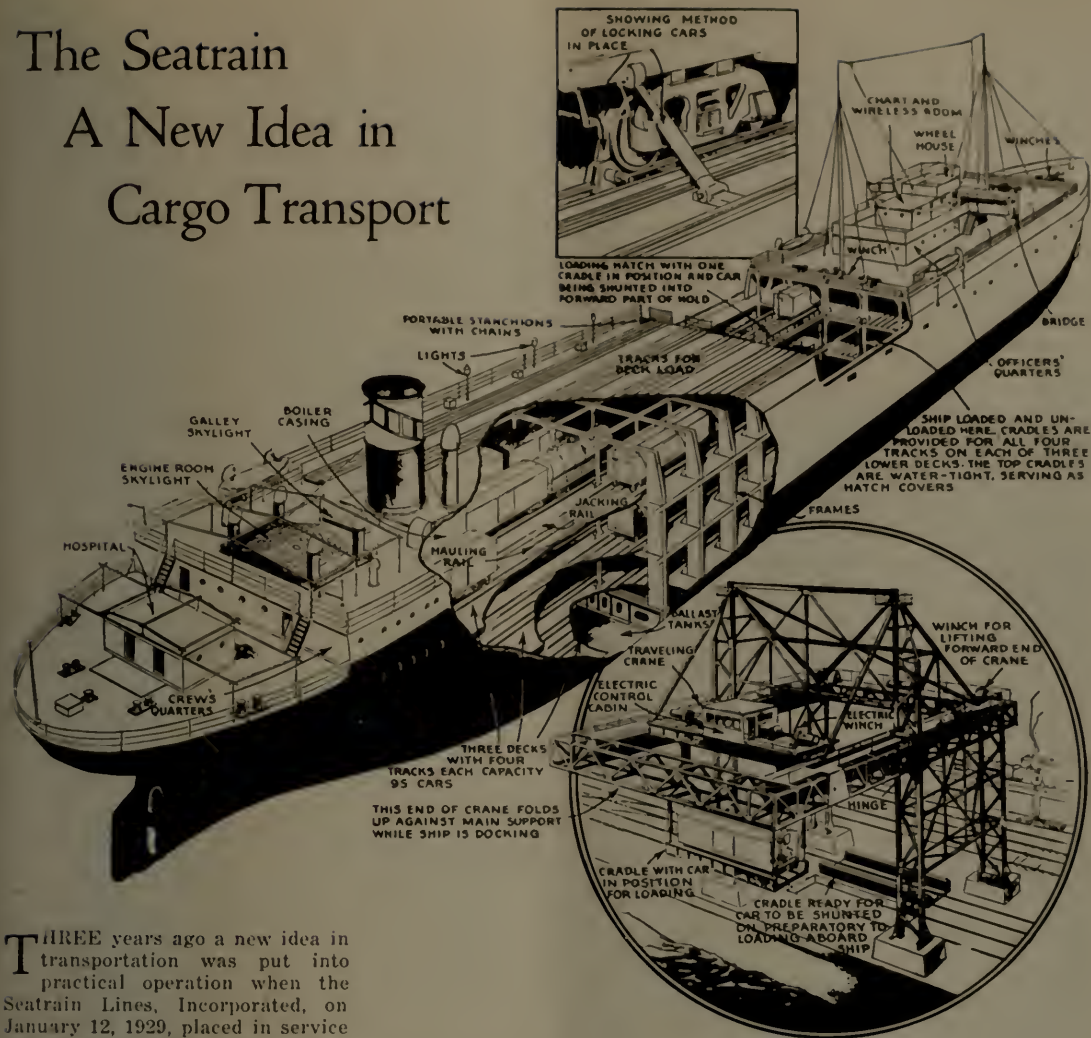
Tankage provision covers 3000 gallons of fuel oil, 185 gallons of lubricating oil, 515 gallons of fresh water, and 10 gallons of gasoline. The fresh water tank is kept under pressure for circulation to pilot house and main deck levels by connection through the reducing valve to the main starting air tank.



Engine room of the Walter Wyman showing her two Fairbanks-Morse 325-horsepower diesels driving Westinghouse direct-current generators.

The Seatrain

A New Idea in Cargo Transport



THREE years ago a new idea in transportation was put into practical operation when the Seatrain Lines, Incorporated, on January 12, 1929, placed in service the Seatrain New Orleans for a through rail freight traffic between New Orleans, Louisiana, and Havana, Cuba. This idea and this vessel have met with such hearty approval on this route that two new and larger vessels of the same type are now being built at the yard of the Sun Shipbuilding and Dry Dock Company, Chester, Pennsylvania, to augment this service.

The Seatrain idea has as its central feature the speeding up of turn-around, the minimizing of loading and discharge costs, the reduction of loss and damage claims. The vessel was designed to make the trip from New Orleans to Havana in 52 hours and to unload and load 95 cars at each port in 10 hours' time. Thus, out of a total elapsed time for round trips of 124 hours, she would be at sea 104 hours, which makes a turn-around with the vessel at sea

earning freights 84 per cent. of her time. This approaches tanker turn-around and, of course, involves special arrangement of vessel and dock for handling loaded freight cars.

Steamship Seatrain is built on the Isherwood System of longitudinal framing. Her principal dimensions are: 427 feet 6 inches long, between perpendiculars; 62 feet molded beam; 37 feet 6 inches molded depth to upper deck; average loaded draft, 22 feet; capacity in freight cars, 95; gross tonnage, 7684; and net tonnage, 4546.

Engine and boiler room spaces are located aft and are equipped with boilers generating steam at 180 pounds pressure and a 28-inch, 46-inch, and 77-inch by 54-inch triple expansion engine generating 3500 indicated horsepower at 76

revolutions and driving the ship easily at 11 knots sea speed in fair weather.

She has two full strength decks and a superstructure deck with a large house under the navigating bridge, providing comfortable accommodation for captain and deck officers. Engineers and crew are housed aft of the engine room casing in the poop tween deck spaces.

Forward of the boiler room bulk head there is a clear open hold to the forepeak, 273 feet long, with a vertical clear height from top of rails to underside of deck beams 14 feet 6 inches in the hold and 15 feet 6 inches in the tween decks. Amidships of these long spaces is a very large hatch opening 55 feet 6 inches long, running the full width of the vessel. In view of this opening the

tank tops are depressed. Double bottom tanks are 5 feet deep in way of the hold and are 3 feet 9 inches deep in way of hatch opening. The longitudinal strength of the hull is maintained in way of hatch opening by the provision of a deep box girder at each side under the upper deck. These girders, 9 feet 6 inches deep by 4 feet 6 inches width, extend seven frames forward and seven frames aft of the hatchway for the full depth of the girders and are tapered up at each end so that they have a length of 91 feet at the upper deck level.

The upper and second deck beams are of deep channel section, supported by three longitudinal girders carried on widely spaced pillars.

The hatch covers at upper and second decks and the floors of the tank top are in the form of car cradles, four at each level. These cradles, with loaded cars, are lifted on or off the ship at either terminal by specially designed cranes. These two cranes are each served by two 500 horsepower motors and are each capable of handling 115 tons on an extreme reach of one foot beyond the outboard track on the vessel. The car cradles at the upper deck level are so designed that they form a weather-tight hatch cover when all four are in place and battened down. At the superstructure deck only one car cradle is fitted over the hatch opening. This cradle is interchangeable in either of four positions, corresponding to the four tracks on that deck and is plated over so as to form a gangway over the hatch opening.

There is a water ballast capacity of 2890 tons. This is divided among after peak, fore peak, double bottom, and port and starboard trimming tanks and is sufficient to keep the ship on level trim while loading or discharging and to maintain adequate stability and immersion in all ordinary conditions of load. Steamship Seatrain is a straight-line hull, no camber and no sheer.

New Seatrains

The two new Seatrain ships are to be along the same general lines as the original vessel, but larger and faster. Their chief characteristics will be: Length between perpendiculars, 464 feet 6 inches; molded beam, 63 feet 6 inches; molded depth, 38 feet 3 inches; capacity in freight cars, 100; average load draft, 22 feet; horsepower, normal, 8000; speed, 16 knots.

The power plant of the new Seatrain ships will be of the most modern American steam type. Three Babcock & Wilcox water-tube, inter-deck, superheater type boilers will be installed, each having 5564 square feet of heating surface and 1044 square feet of superheating surface. The safety valves of these boilers will be set at 437 pounds and total temperature of steam at superheater outlet will be 700 degrees Fahrenheit. Each boiler will be fitted with the Babcock & Wilcox internal drum type desuperheater and with four B & W mechanical atomizing Cuyama type oil burners.

A De Laval double reduction gear compound marine type turbine takes steam from these boilers at 400 pounds pressure and 235 degrees

Fahrenheit superheat, generating normally 8000 shaft horsepower and having a continuous overload capacity for 8800 shaft horsepower. Practically all of the auxiliaries are electrically operated. Pumps are supplied by Worthington.

The Seatrains method of handling mixed cargo has many advantages:

(1) Over-all time in transit is reduced, thereby cutting cost of transport, cost of insurance, and cost of carrying stocks;

(2) Stevedoring is minimized, thereby cutting to a very marked degree the labor cost at terminals and loss and damage claims items incident to handling and rehandling merchandise;

(3) Adjustment of claims is simplified since there is no possibility of contamination or odor absorption from other cargo and no trouble with damage from ship's sweat or leaky pipes;

(4) It is practicable to give each car special treatment at sea, such as using ventilation. At sea specially trained attendants patrol the decks of the Seatrain night and day, punching time clocks at certain stations and recording reports on conditions at each car;

(5) This method of handling cargo does away with any necessity for expensive export packing. The car forms the package.

All of these advantages combined have enabled the Seatrain Lines, Inc., to produce such a remarkable record in the delivery of cargo that they are able to obtain substantial reductions on insurance rates from cargo underwriters.



The Seatrain New Orleans alongside of her pier at New Orleans, showing the crane for handling the car-loaded cradles from the dock to the ship or from ship to the dock. The outboard portion of the truss bearing the crane track folds up out of the way when the ship is coming alongside the dock. Aside from this crane mechanism and support, the dock is a very simple structure, whose only function is to support the double track railway.



Marine Equipment

MECHANICAL COW ~ NEW PROCESS WROUGHT IRON
PACIFIC COAST LINOLEUM ~ KEEPING COOL AT SEA

Mechanical Cow Afloat

*Fresh Milk and Cream Daily
at Low Cost*

THE problem of securing a supply of milk and cream acceptable to the taste of passengers has long been a source of worry to the ship's steward. During the war, however, it was proved that a really urgent demand for fresh milk at sea could be met by means of the De Laval emulsor. These machines were installed upon hospital ships to provide the milk which in many instances must have meant the difference between life and death to convalescing dough boys being brought home. Now ocean steamship companies are turning to the use of the emulsor as a means of giving passengers an extra and often unexpected treat in their dining salon; also, in the case of some companies, which have previously gone to much expense to obtain and store milk which when consumed proved often to be of mediocre quality, a worth while economy has been effected.

One of the first commercial vessels to be equipped with the De Laval emulsor was the steamship Guatemala of the Panama Mail Services of the Grace Lines.

This apparatus, as installed by the De Laval Pacific Company, proved so satisfactory that a second installation was immediately made on the steamship El Salvador. These steamers operate from San Francisco to New York via Central America and the Panama Canal. Before installing these machines it had been customary to take on enough milk and cream at San Fran-

De Laval mechanical cow installation on board the Panama Mail Line steamship El Salvador.



cisco to last to Panama, where a fresh supply was secured to last until arrival at New York.

The Guatemala's steward declared that on first round trip with the "mechanical cow" passengers consumed twice as much milk and cream as formerly and that, in spite of the larger quantity consumed the steamship operators saved at least one dollar a day net on the cost of milk and cream. The cost of fresh milk with the emulsor was but 18 cents a gallon and of 20 per cent. cream but 60 cents a gallon. The quality, according to passengers, compares favorably with the best milk and cream ashore.

The "mechanical cow" consists,

as shown in the illustration, of three pieces of mechanism: namely, a mixer equipped with electric motor-driven agitator and suitable source of heat; a centrifugal emulsor; and a cooler. When equipped with this apparatus, the steamship company buys in a favorable market its requirements in skim milk powder and unsalted butter. Both of these products can be stored indefinitely and, mixed with the proper proportion of water, they contain all the elements of cow's milk. The "mechanical cow" provides a means of reuniting them to form fresh whole milk and cream, as needed. On the Guatemala, for instance, the practice is to produce 25 gallons of

whole milk containing 4 per cent. butter fat on one day and 15 gallons of cream containing 20 per cent. butter fat on the next day. Neither product is more than two days old when consumed.

The process is simple. Skim milk powder and water are combined in the proper proportions and sufficient sweet butter is added to give the butter fat content desired. The mixture is then gently heated and agitated in the mixer until the powder and the butter are completely liquefied. The mixture is then brought to the pasteurizing temperature—143 to 145 degrees Fahrenheit—and held there for thirty minutes. It is then run through the emulsor, which forces it by high centrifugal force through very small openings thereby breaking it up into minute particles and forcing these particles together into a permanent emulsion. This emulsion (milk or cream) is delivered into a cooler, which almost immediately lowers the temperature to 50 degrees Fahrenheit. The product has approximately the same keeping quality as ordinary fresh pasturized milk.

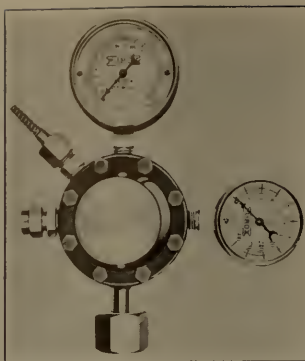
Another interesting feature of the use of the "mechanical cow" at sea is the fact that it releases for other uses a considerable amount of valuable refrigerator space.

Pressure Regulators

THE Linde Air Products Company has recently introduced an entire series of new and improved Purox oxygen and acetylene regulators superseding its former line of Purox Metal Master type. All Purox welding or cutting outfits now include these new regulators.

The new Purox series comprises six regulators, designated as Nos. 33 and 34 for acetylene; Nos. 13, 14, 23, and 24 for oxygen. All are of metal construction, simple, compact, rugged, and workmanlike in appearance and thoroughly reliable in performance. The required volumes of oxygen and acetylene essential for maintaining a neutral flame at the blowpipe tip are delivered to the welding or cutting blowpipe at uniform pressure.

One of the outstanding design

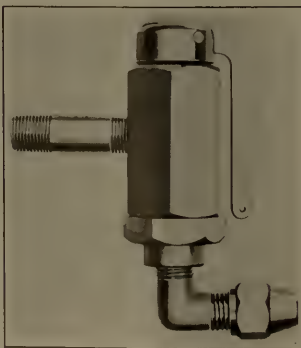


One of the new line of Purox pressure regulators.

features is an accurate self-aligning valve of the nozzle and yoke type, insuring sensitive action and freedom from leakage. Simplicity of construction eliminates any need of disturbing the diaphragm, bonnet, pressure adjusting screw, or pressure adjusting spring when replacing a worn valve seat. Access to the interior is gained by removing a plug in the rear of the body. The valve seats are made of a material not easily marred, scratched, or damaged by foreign particles that might find their way into the inside of the regulator.

The diaphragms are made of a special corrosion-resisting alloy assuring long life. A rupturing disk safety release on the oxygen regulator provides protection to the diaphragm should abnormal pressure occur. Although seldom if ever necessary, the operation of replacing the diaphragm is quite simple.

In accordance with the standard color specification for oxy-acetylene equipment, oxygen regulators are painted green and acetylene regulators red. Purox regulators are list-



The new P-O-L primer.

ed as standard by the Underwriters' Laboratories and the Factory Mutuals Laboratories.

New Acetylene Engine Primer

THE P-O-L Primer, a unique device for facilitating the starting of internal combustion engines, either mobile or stationary, has just been introduced by The Linde Air Products Company. The P-O-L Primer is a simple and easily installed device for introducing acetylene, a highly combustible gas, into the cylinders of an internal combustion engine so that it will start easily and quickly.

The Primer consists, essentially, of a special stem type brass primer valve, a Prest-O-Lite pressure regulator and 10 feet of 1/4-inch brass tubing with compression unions. The assembly is used in conjunction with the ordinary Prest-O-Lite tanks that are so extensively used for headlighting systems. These tanks are carried in stock at all important waterfront points on the American coast line.

The primer valve is mounted on the intake manifold of the engine, the regulator attached to the tank valve and the two connected with 1/4-inch brass tubing. The regulator automatically reduces the tank pressure of the acetylene to a low line pressure and the primer valve controls its flow into the manifold. The valve is operated by a pull wire which leads from the valve lever to any convenient point at the control stand. If the motor boat is already equipped with a Prest-O-Lite tank, both primer and lighting system may be operated simultaneously from the same tank by the use of a simple adaptor.

Steam Turbine Repairs. Todd Shipyards Corporation, 25 Broadway, New York, N. Y., sets forth in a leaflet—illustrated with some fine half-tone pictures—its reasons for being proud of the high efficiency developed by its steam turbine department in performing repairs and replacements. The leaflet briefly outlines the part played by each one of the plants on the Atlantic, Gulf, and Pacific Coasts in extending this uniform Todd service to its clients.

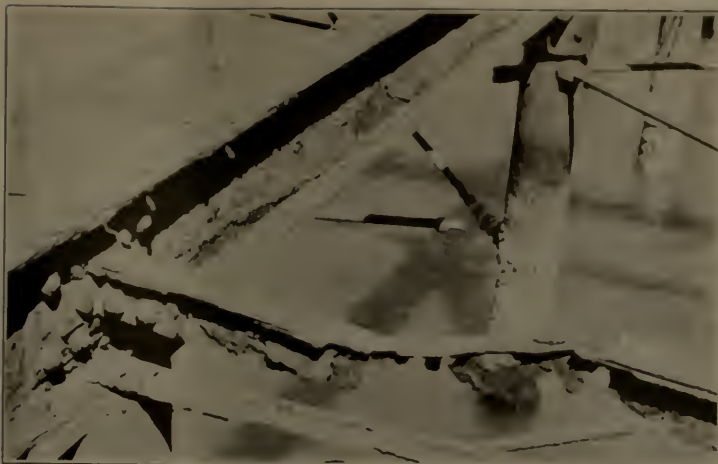
New Process Wrought Iron

SINCE 1918, A. M. Byers Company, for many years American leaders in wrought iron products, have been carrying on intensive laboratory research and practical development in perfecting a mechanical process that would reduce production costs, produce a more uniform metal, and allow quantity production of wrought iron. This development work has been completed and Byers' new process wrought iron plant is now on a production basis with an ultimate capacity one-third greater than the previous total annual capacity of all the wrought iron plants in the United States.

Wrought iron is an ideal material for many uses aboard ship because of its well-known corrosion-resistant qualities and its retention of toughness and fibrous structure under long repeated alternate stresses. The fact that a superior wrought iron will now be available in plates, skelp, bars, rods, and other shapes at reasonable cost should be of great interest to all naval architects, shipbuilders, and ship operators. The process, as developed by the A. M. Byers Company, is virtually a mechanization of the puddling process and a refinement of treatment and control. The raw materials involved are pig iron, roll scale, iron ore and sand.

Pig iron is melted in cupolas, tapped into ladles, conveyed to Bessemer converters, refined to a high degree, and poured into the ladle of processing machine.

Roll scale, iron ore, and sand in proper proportions are fused in open hearth furnaces to form a silicon iron slag. This molten slag in a ladle is brought directly under the processing machine ladle for the key operation. The processing machine, by a slow pouring combined with oscillatory and reciprocating motions, deposits the molten refined iron in the molten slag with uniform distribution. The slag temperature being several hundred degrees cooler than the freezing point of the molten iron, the latter is suddenly solidified, releasing its dissolved gases with such suddenness that it is shattered into small fragments which settle to the bottom of slag. Since slag is a good



A very interesting example of the long life of wrought iron exposed to sea waters is shown in the above illustration. The photograph was taken recently when Dock No. 4, built by the Quartermaster's Department of the Army in 1884 at Fort Mason on San Francisco Bay, was dismantled. The wrought iron piles were in condition for "forty years" more of good service. The steel superstructure was practically gone.

flux and the operation is at good welding temperature, these fragments weld together to form a sponge or "puddle ball."

The "puddle ball," weighing 6000 lbs. or more, is transferred to a 900-ton press and speedily converted into a solid rectangular bloom, 18 by 24 inches by about 6 feet in length. The pressure in compacting is more than sufficient to eliminate all excess slag. This bloom is immediately rolled to billets of desired size on a 40-in. reversing blooming mill operated by a 5000-horsepower motor. Modern rolling mill equipment produces from these billets any plate or shape desired on quantity production schedules.

Laboratory and practical tests approve this new process wrought iron as having all the best qualities of the finest hand puddled product and as being much more uniform in texture and in chemical content.

For many years Byers Wrought Iron Pipe has been specified by marine engineers and naval architects for use on shipboard. Already naval architects are beginning to specify Byers wrought iron plates wherever there is active corrosion. A very striking example of this is the United States Public Health Service tug *Walter Wyman*, completed in January 1932. Designed for service in New York harbor, where sewage pollution is making a cumulative corrosion problem, the hull of this tug was built of Byers wrought iron plates below the light

load water line.

Another marine use for wrought iron is in dock construction. A very interesting example of the long, useful life of wrought iron in this connection was uncovered at Fort Mason, San Francisco, last year, when the War Department decided to dismantle old Dock No. 4 built by the Quartermaster Department of the Army in 1884. This dock is of timber floor construction with timber stringers on steel I-beam joists supported by 86 genuine wrought iron piles. It was dismantled to make room for a new recreation pier and aquatic park. A remarkable fact is that the bearing piles, being of genuine wrought iron, have never been repaired or replaced during all these years and are in first class condition to-day, and by replacing the steel I-beam caps and braces this dock would be good for another forty years. One realizes the difference between the steel and genuine wrought iron when contrasting the 12 inch steel I-beams which are nearly all corroded, and particularly the 6-inch I-beams which are completely gone, creosoted timber fender piles, the life of which is not more than ten years, and green timber piles which last about eight months.

Representing the A. M. Byers Company to the marine field on the Pacific Coast is Richard Fuite, with headquarters in San Francisco. H. K. Browning is western regional manager.

Ross Carriers

Straddle the Pacific

*Modern Equipment Revolutionizes
Lumber Handling*

AS the original straddle truck and the recognized leader in that type of conveyor, the Ross Carrier has for years been standard equipment in the saw mills, wholesale and retail lumber yards, and on the mill docks of the Pacific Coast. More recently the cost saving qualities of this truck have been appealing to all lumber yards and to all industries that have regular or frequent handling of long, heavy materials, such as reinforcing rods, pipe, structural steel poles, and piles. Several hundred units are now at work on Pacific Coast piers and in Pacific Coast industries.

With the export of heavy timbers from the Pacific Northwest to the markets of Asia, Europe, Africa, and South America, the Ross carrier has followed the "long sticks"; and to-day these efficient, practical tools of the lumber yard are straddling the Pacific Ocean, and are now operating in many foreign ports.

The Ross carrier, as now built, has incorporated all the experience gained from this world-wide distribution and diversity of application. Standard specifications call for: four- or six-cylinder Continental gasoline motors; transmissions with alloy, heat-treated, steel gears, giving three speeds ahead and

three reverse; Brown-Lipe-Chapman differential; 4-wheel steering; Auto-Lite starting and lighting system, with Exide batteries; all parts subject to shock loads of alloy steel forgings; all tires, either pneumatic or special width solid rubber. Twelve standard sizes range in load height from 36 inches to 77 inches and in load width from 36 inches to 77 inches. Special sizes can be made to order to cover any desired condition.

Starting from scratch, this carrier can straddle, pick up, and be on its way with a five-ton load of lumber in 11 seconds. It can discharge and be away from that same load in 5 seconds.

The savings effected in lumber yards and mills by this method, as compared with the old method of loading on dollies propelled by tractors or on motor trucks, are almost unbelievable.

At the McCormick Lumber Terminal, Ltd., largest lumber terminal in San Francisco Bay district, six Ross carriers are operated. This is a commercial terminal handling lumber from and to not only McCormick company steamers, but also all American and foreign flag vessels making San Francisco Bay. The management of this terminal is enthusiastic in its praise of the



Bow view of a Ross carrier with load up.

Ross carrier; saying, "... maintenance cost of the carrier is negligible. We can handle lumber at one-fourth the cost of the old hand-loaded motor truck method, we can save ships' time because one of our Ross carriers can keep four winch gears busy discharging—we can keep our customers happy by more prompt delivery, more accurate spotting, and less damaged lumber. These carriers are used for delivering lumber all over San Francisco and can deliver at less cost than any other equipment of which we have any knowledge."

The six Ross carriers at this lumber terminal spotted in the yard over six million board feet—the discharge from six vessels—in one week recently and besides attending to considerable local delivery.

The Murray Jacobs Company is Western and Southern distributor for the Ross Carrier Company, maintaining office and sales rooms at 613 Howard Street, San Fran-



Five of the six Ross Carriers at the Chas. R. McCormick Lumber Terminal, San Francisco, with loads up ready for delivery.

One of the great advantages of the Ross Carrier is its ability to handle long, heavy pieces, such as floor timbers, piles, poles, pipe. Such material can be spotted by the carrier in any location where there is room to swing the load. Steering on all four wheels, this straddle truck performs many almost unbelievable stunts in delivering such loads to construction gangs.



also; 528 First Avenue South, Seattle; and 146 North First Street, Portland, Oregon. The plant and general offices of Ross Carrier Co. are at Benton Harbor, Michigan, and its New York offices are at 260 West Broadway. Offices are also maintained at New Orleans.

mont and Henderson; U.S. light vessels Blunt's Reef and Swiftsure; and U. S. Navy hospital ship Relief. The latter vessel has a large number of special cabinets and cooling machines. The X-ray room, for instance, is fitted with a special Frigidaire unit for keeping the development trays, washing water, and fixing solutions at the exact

operated by the Pacific Steamship Company. This vessel has a number of refrigerated cargo compartments and boxes for perishable foods. These are refrigerated by an installation of ten Frigidaire units in a single battery. Each unit can be set to automatically maintain the required temperature. Thus fish cargo may be maintained in a frozen condition, while in the next compartment certain vegetables and fruits may be maintained at 40 degrees Fahrenheit, the machines taking care of these temperatures through automatic control.

Keeping Cool on the Pacific

THE carriage of perishable cargoes by sea and the demand for varied cuisine created by modern standards in sea passenger travel have brought about a special technique of marine refrigeration into which the Frigidaire automatic refrigeration unit and the various items of the Frigidaire line, such as water coolers, drinking fountains, cabinets, and ice cream machines fit with ideal nicety.

That this fact is appreciated by the owners and operators of Pacific Coast vessels is evidenced by the wide-spread use of Frigidaire units in all classes of ships in the Pacific merchant and naval marine.

A large majority of the United States naval vessels of the Pacific Fleet in all classes have installed Frigidaire units for their automatic cooling, refrigerating, and ice cream making requirements. Since the development of the F-12 refrigerant and its use by Frigidaire, these units have United States Navy approval even for use in submarines.

Other examples of United States Government Pacific marine use are aboard: U.S.A. transports Chau-



Frigidaire drinking fountain on board the Coast Guard cutter Itasca.

temperature best suited to handle gelatin films.

Many instances might be cited of Pacific Coast fishing vessels, yachts, freighters, and passenger vessels that carry Frigidaire units either exclusively or supplementing the ship's refrigeration plant. One very interesting example of the flexibility of this unit and its adaptation to the refrigeration needs of a ship is the installation on the steamship Admiral Farragut, coastwise freight and passenger vessel

Trade Literature

Vacuum Refrigeration Systems. Foster Wheeler Corporation, 165 Broadway, New York, has recently issued Bulletin W.J.-31-3 which describes a new method of refrigeration by evaporating, under high vacuum, a portion of the water or brine to be cooled.

The Cardinal Reasons Why you Save Money is the title of a little booklet issued by the American Cable Company, 230 Park Avenue, New York. It presents the theory and application of Tru Lay Preformed wire rope.

Sandusky Centrifugally Cast. — The Paper and Textile Machinery Co., Sandusky, Ohio, has ready for distribution a 4-page leaflet setting forth the method of producing and the many uses for centrifugally cast metals. The leaflet contains also standards and specifications and is illustrated with pictures of products made from this metal.

Battleship Linoleum Built on Pacific Coast

*Complete Plant Erected in Emeryville for the
Production of Modern Floor and
Deck Covering*

IN these days of retrenchment it is cheering to discover, now and then, the expansion or branching out of some long-established, carefully managed Pacific Coast Industry. Particularly is this true when the expansion or change indicates a growing faith in the future not only of the industrial and household markets, but also of the Pacific marine market.

A very recent and very meaningful instance of such expansion was the entrance of The Paraffine Companies, Inc., into the manufacture and the marketing of linoleum products on the Pacific Coast.

The Paraffine Companies, Inc., and its predecessors date back to pioneer days in California. They own a large industrial site on tidewater on the eastern shore of San Francisco Bay at Emeryville. On this site were already located, all very modern and up to date, a plant said to manufacture more paint than any in the country west of Chicago; a plant thoroughly equipped for the manufacture of asphalted felt roofing and asphalted-felt

One of the most important parts of the process of manufacturing linoleum is the "stoving." At the right is shown one of the chambers in the huge linoleum stove at the plant of The Paraffine Companies, Inc. Practically perfect heat and humidity control is maintained in these chambers.

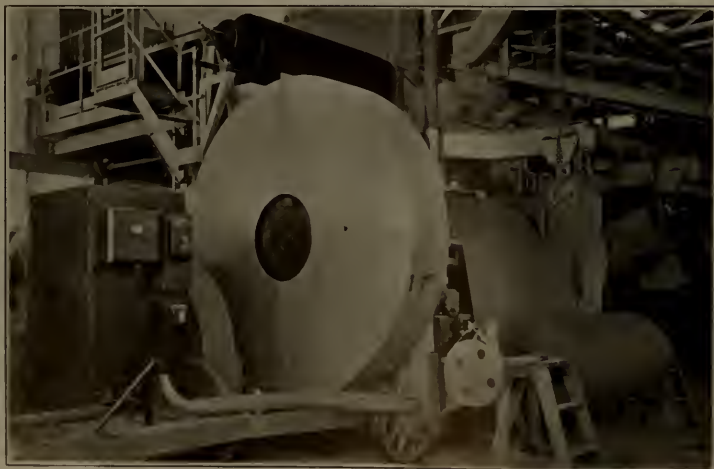


(Mastipave) flooring; machines and devices for the production and processing of raw materials basic to these products; and the machinery, warehouse space, and facilities incident to their stowage and shipment.

Now there has been added a complete modern plant for the production of linoleum, starting with the raw products—cork, wood flour, raw linseed oil, and burlap. In this plant, as in all of the Paraffine Companies' installations on this

site, the machinery is partly commercial, bought in the open market, and partly developed to meet the requirements indicated as necessary by their own special experience with similar processes in large quantity production. The installation is of a very substantial character and of considerable cost and is justifiable only on the future industrial expansion and population growth of the Pacific Coast.

Since "battleship" and other types of linoleum find large use on



The calendar rolls which apply the cork linoleum mixture to the burlap backing are carried on a portable truck structure so arranged that it may be operated to run the calendared product into any one of the chambers which compose the linoleum stove.

shipboard and since the increasing use of our Pacific Coast harbors by shipping is also dependent on industrial expansion and population growth, it is plain that there is a high community of interest between this new Pacific Coast industry and Pacific Coast shipping. In fact the entire plant at Emeryville is an object lesson in the dependence of shipping on such industries.

On a recent visit to the plant we noted large quantities of: wood-oil from China; burlap from Scotland; cork from Spain; rags from China and India; redwood bark from Eureka, all of which had been transported by ships. A large part of the products leave the plant by salt water routes.

From what we know of the Paraffine Companies, it can be safely assumed that all possible markets for the products of this new linoleum plant were surveyed thoroughly and that the survey showed very favorable prospects.

Modern ships use a great deal of linoleum. In the navies of the world linoleum long ago became standard flooring for the steel decks in way of living quarters on shipboard. Hence the term "battleship linoleum." In fact, linoleum, when first invented in 1860, found its principal use on the iron decks of ships in way of passenger and officer quarters. To-day, although the household and industrial trade



At the controls of the Carrier air conditioning system which regulate the temperature and humidity of the air in the linoleum stoves at the plant of The Paraffine Companies, Inc., Emeryville, California.

form the real volume outlet for the product of the world's linoleum factories, the executives of those factories are still intensely interested in the marine trade.

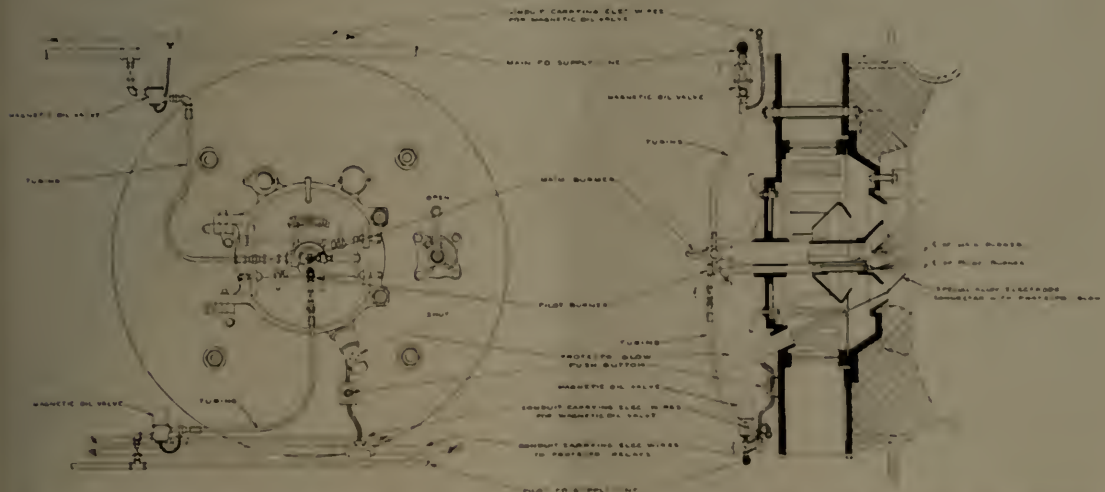
San Francisco, as a great home port for ships, enjoys a large volume of ship repair and ship reconditioning work, and the establishment of this plant for the produc-

tion of linoleum on San Francisco Bay should be of great interest to all the shipowners and the shipbuilders of this port.

Plain brown battleship linoleum and painted linoleum in solid colors or in attractive patterns in many colors are now obtainable from a Pacific Coast plant. This linoleum is of a very high grade and is stocked in commercial widths and in a great variety of colors and patterns. Ship builders and ship operators who have special requirements in "custom built" linoleum floors are invited to consult with The Paraffine Companies, Inc.

Trade Literature

Engineering Achievements, 1931. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn., has published in booklet form, nicely bound and profusely illustrated, the story of advancement in the electrical field during the year 1931. This can be no small account, as, according to Vice-President Kintner in the foreword, "From the record of technical achievement in 1931, no one would suspect the existence of industrial depression." Transportation by Land, Sea, and Air are treated in one chapter and present many achievements of which Westinghouse may feel proud.



In the April issue of Pacific Marine Review there was published an article describing a new type of Todd oil burner for the furnaces of marine boilers. We here show a front elevation and cross-section of that burner. These drawings illustrate very clearly the application of the pilot burner and of the electrode and Pro-Tecto-Glow device which gives the alarm and operates the magnetic oil valve when the flame of the pilot burner for any reason is extinguished. These new type burners are being installed in the new tankers being built for the Standard Shipping Company.



American Shipbuilding

Edited by H. C. McKinnon

Vessels to be Reconditioned. — The Shipping Board recently approved a loan of \$300,000 to cover three-quarters of the cost of reconditioning the freighters Point Ancha and Ossining by Swayne & Hoyt, Inc., of San Francisco. The freighters are operating in the company's Gulf Pacific Mail Line under the provisions of Foreign Ocean Mail Route No. 55 from Pacific Coast Ports to the north coast of South America, West Indies, and east coast of Mexico. Under the provisions of the mail contract, the speed of the vessels must be increased and limited passenger accommodations (in this case for about 12 persons) added.

The vessels are 395 ft. length, 33 ft. beam, 23 ft. 8 in. draft, 10,465 tons displacement, and 10 knots sea speed.

It was originally thought that in order to get a speed of 12 knots at sea it would be necessary to equip these vessels with exhaust turbines to increase the propulsion and also to lengthen the hull and fair the lines of the stern in order to get a hull with better propulsive efficiency. One of these vessels has been fitted with a contrapropeller at the Todd Dry Docks, Inc., Seattle; and this contrapropeller has so improved her performance that it is now thought possible to get sufficient speed with the installation of the exhaust turbine, eliminating the expense of lengthening the ship. Specifications are now being prepared with this idea in view and bids will be called for shortly.

These vessels are fitted with standard 2800-indicated-horsepower triple-expansion engines of the Shipping Board war-time building program type. By installing at the after end of these engines a 1075-horsepower exhaust turbine operating at 3600 revolutions per minute and double reduction gearing to connect this turbine with the propeller shaft, and installing also a new condenser fitted with air ejectors, it will be possible to have a combined shaft horsepower of 3235; and it is estimated that this

horsepower, with the increased propulsive efficiency afforded by the contrapropeller, will give a trial speed in quiet water of approximately 13 knots, which is sufficient to insure the normal sea speed of 12 knots demanded by the mail contract.

Orders for the machinery have been placed. One vessel is to have a Westinghouse exhaust turbine and the other an American Bauer-Wach exhaust turbine. Both will have new Westinghouse condensers fitted with ejectors. The two new circulating pumps will be supplied by De Laval Steam Turbine Co. Miscellaneous new pumps needed will be Worthington.

The company is deferring indefinitely all changes to the hulls and for the time being will not make any provisions for passenger accommodations, but will only make the changes in machinery, as noted above, to bring the vessels up to speed requirement.

Pipe-Line Dredges Ordered. — Dravo Contracting Company, Pittsburgh, Pa., has received the contract from the U. S. Army Engineers, Washington, D. C., for two 20-inch pipe-line self-propelled dredges on a low bid of \$736,300 for the two. These dredges are intended for the St. Louis Engineering District.

The dredges are to be of steel construction with stern-wheel propulsion. Their dimensions are:

Length between perpendiculars	200' 0"
Length over-all	265' 2"
Beam molded	47' 10"
Beam over-all	48' 7-1/8"
Depth molded	8' 0"
Crown of deck	6'

Each dredge is to be equipped with turbo-electric power plant, consisting of two water-tube boilers operating at 300 pounds pressure and 100 degrees Fahrenheit superheat; one turbo-generating set of 1000-kilowatts capacity electrically

connected to 1200 horsepower dredge pump motor; and two horizontal tandem compound poppet valve engines, taking steam at 300 pounds and 100 degrees Fahrenheit superheat and working on 2-inch vacuum which drive the stern wheel.

Large Reconditioning Order. — Newport News Shipbuilding & Drydock Company, Newport News, Va., has been awarded contract by the Mississippi Shipping Company, Inc., Hibernian Bank Bldg., New Orleans, La., for reconditioning and betterments to two freighters, on a low bid of \$351,800 for the two. This figure does not represent the total cost of the reconditioning of the freighters, as the owners are furnishing considerable material which will bring the total cost to about a half million dollars for the two.

The freighters to be reconditioned are the Clavarack and the Casey and the designs for the work were drawn up by George G. Sharp, 30 Church Street, New York, and J. F. Paige, 17 Battery Place, New York. The work will be done under the supervision of N. L. Pedrick, general manager of the shipping company.

The vessels will be modernized in deck and machinery departments and accommodations will be built in for a limited number of passengers. This company very successfully reconditioned the steamships Delsud and Delnorte last year at a cost of one million dollars.

Plant Busy. — The Washington Iron Works, Seattle, Wn., is busily engaged in turning out several orders for Washington diesel engines in addition to considerable other work engaged in by the plant. The fire reported last month as partially destroying the plant did no harm to the new steel and concrete structure, but burned the old wooden structure occupied by the company several years ago.

Antigua Delivered. — The turbo-electric liner Antigua, first of the three passenger and refrigerated cargo vessels building at the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., for the United Mail Steamship Company of Boston, arrived at San Francisco on her maiden voyage April 21. This vessel and the two others still uncompleted are sister ships to the Talamanca and Chiriqui, recently delivered from the yard of the Newport News Shipbuilding & Drydock Company. A sixth vessel, the Segovia, was burned at the outfitting dock at Newport News, and announcement has not yet been made as to whether the hull will be rebuilt or abandoned.

These vessels have following dimensions: length over-all 446 ft. 9 in.; length between perpendiculars, 130 ft.; beam molded, 60 ft.; depth molded to upper deck, 34 ft. 9 in.; maximum molded draft, 24 ft. 9 in.; gross tonnage 6963; net tonnage 3183; refrigerated or air-cooled cargo capacity, 196,000 cubic feet; fuel oil capacity, 1450 tons.

These vessels are being built for the service of the United Fruit Company between Atlantic and Pacific Coast ports and Central and South American in the banana trade. While primarily refrigerated cargo vessels, the United Fruit Company has built up a very high class passenger service in this trade and the new vessels are considerably larger than any others of the "Great White Fleet" and are equipped to accommodate 113 first class passengers in 61 staterooms. The staterooms and public rooms are furnished in artistic and comfortable style for the tropical routes covered, and the most modern equipment has been installed to provide for safety and comfort at sea.

The vessels are provided with the same types of power plants and auxiliary machinery. The main propulsion plant consists of two main turbo-generators supplying power to the two main propulsion motors furnished by the General Electric Company. Four standard marine type water-tube Babcock & Wilcox boilers supply steam for the turbines. The refrigeration machinery was supplied by the York Ice Machinery Corporation.

Three of these vessels, the Talamanca and Chiriqui, built by Newport News, and the Antigua, built by Bethlehem, will be operated in regular fortnightly 18-day service



Steamship Antigua, latest addition to the Great White Fleet.

between the ports of San Francisco and Los Angeles Harbor and the ports of Balboa and Puerto Armuelles. The other three vessels will be operated on the East Coast and Gulf.

The steamship Veragua, the last of three vessels being built by the Bethlehem Shipbuilding Corp., was launched on April 23.

Miss Patricia Winifred Preston, granddaughter of a former president of the United Fruit Company, acted as sponsor assisted by two maids of honor, Miss Sallie Mosser and Miss Allison Kimpton.

It is expected that the sea trials of the Quirigua will be held sometime this month.

New Lighthouse Tender. — Bath Iron Works, Bath, Maine, has been awarded contract by the U. S. Bureau of Lighthouses for the construction of the lighthouse tender Hickory. The vessel is to be 131 ft. long, 8 ft. 6 in. draft, of steel construction. She will be powered with a steam engine developing about 500 horsepower. The tender is scheduled for service in Long Island Sound to replace the tender Pansy in handling of buoys and other heavy objects.

Bids submitted on this work were as follows:

Bath Iron Works, \$152,480 and 300 days; New York Shipbuilding Co., \$175,000; Pusey and Jones Co., \$174,800; United Dry Docks Co., \$190,000; New Jersey Dry Dock & Trans. Co., \$241,000; Todd Shipbuilding Co., \$205,000; Sun Shipbuilding & Dry Dock Co., \$219,890; Manitowoc Shipbuilding Co., \$202,950; Maryland Drydock Co., \$177,959; Tampa Shipbuilding Co., \$244,894.

Two Patrol Boats. — John H. Mathis Company, Camden, New Jersey, was the successful bidder for

the construction of two new 165 ft. patrol boats for the U. S. Coast Guard. Bids were opened at Washington, D. C. as follows:

John H. Mathis Co., Winton engines and equipment, \$174,000.

Bath Iron Works Corp., Winton engines and equipment, \$175,616; Cooper - Bessemer engines, \$180,466; McIntosh & Seymour engines, \$185,396; Fairbanks-Morse engines, \$185,466; Superior engines, \$185,551.

Marietta Mfg. Co., Winton engines and equipment, \$185,000.

The Maryland Dry Dock Co., Winton engines and equipment, \$187,371; Cooper - Bessemer engines, \$187,986; Superior engines, \$192,355; Fairbanks - Morse engines, \$193,078; McIntosh & Seymour engines, \$198,472.

Electric Boat Company, own engine design, \$189,700.

New York Shipbuilding Co., Winton engines and equipment, \$190,000.

Tampa Shipbuilding & Eng. Co., engines not specified, \$198,000.

The Pusey & Jones Corp., Winton engines and equipment, \$204,000.

United Dry Docks, Inc., engines not specified, \$226,500.

Todd Dry Dock Eng. & Repair Corp., engines not specified, \$235,000.

Sun Shipbuilding & Dry Dock Co., engines not specified, \$237,000.

General Eng. & Dry Dock Co., Winton engines and equipment, \$245,771.

These two patrol boats are to be powered with two Winton diesel engines of 650 horsepower each, and they are to be similar to the seven patrol boats just completed for the Coast Guard by the Bath Iron Works.

Repairs to U.S. Grant. — General Engineering & Drydock Company,

Oakland, Calif., was awarded contract last month on a low bid of \$165,732 for betterments to the U. S. A. transport U. S. Grant.

The main feature of the work is covering in of both fore and after well decks, giving the vessel a flush deck all the way from forecandle head to poop. The space beneath the new deck is to be used for enlarged troop quarters and will add greatly to the comfort of both enlisted men and officers. Various alterations are to be made below decks, steam heating and electric lights will be installed.

Alaska River Boat Planned.—W. C. Nickum, naval architect, 400 Polson Building, Seattle, Wash., is preparing plans and specifications for the new Alaska stern-wheel river boat to be built this year for the Alaska Railroad. The vessel is to be steam powered, about 210 feet long, with accommodations for about 75 passengers and freight capacity of about 250 tons. O. F. Ohlson is general manager at Seattle for the Alaska Railroad. Bids will probably be opened at the Seattle office of the Department of the Interior, 71 Columbia Street, Seattle, Wash., in charge of J. R. Ummel, office manager and purchasing agent.

Important Repair Contract.—New York Shipbuilding Co., Camden, N. J., was recently awarded contract for the reconditioning of four freighters of the American Scantic Line operated by the Moore & McCormack Company, Inc., 5 Broadway, New York. The vessels are the Schenectady, Chickasaw, Bird City, and Saguache.

Monterey Trials.—On her standardization trial run off Rockland, Maine, April 21, the steamship Monterey, second transpacific liner building for the Oceanic Line of San Francisco (Matson Navigation Co.), exceeded 23 knots speed. This speed was developed on 28,900 shaft horsepower. The vessel is scheduled to sail from New York, May 12, on her maiden voyage to the Pacific Coast.

Two Steam Tugs.—The Pusey & Jones Corp., Wilmington, Del., was low bidder recently for the construction of two steam tugboats for the Meseck Towing & Transportation Company, Inc., Pier 59, North River, New York, N.Y. The tugs are to be 104 ft. 1½ in. long, 28 ft. 6 in. beam, 13 ft. 2½ in. depth. They will

be powered by reciprocating steam engines. Brown & Demarest, Totenville, Staten Island, N. Y., are the designers.

Quarantine Tug.—Bath Iron Works, Bath, Me., has been awarded contract for construction of a quarantine tug for the U. S. Public Health Service, Boston. The tug is to be of steel construction, 60 ft. long, 15 ft. beam, 7 ft. draft. Diesel engine is to be supplied by government. Cost of construction is \$29,980.

Cutter Bear.—The old cutter Bear, now decommissioned and laid up at Oakland, Calif., is being surveyed by Arthur B. Raymond, New Jersey naval architect, who seeks to ascertain the vessel's fitness for use by Admiral Richard E. Byrd in his proposed Antarctic expedition. The cutter Bear served for many years in the Arctic and is said to be still in good condition. She was presented to the City of Oakland for use as a museum, and there is some question as to whether or not the City Council could legally loan, charter, sell, or give to Admiral Byrd this former government vessel. If no legal difficulties interfere, and the vessel is found to be in sound condition, Admiral Byrd will doubtless choose the Bear and outfit it here for his expedition.

New Water Taxi.—Nunes Brothers' Shipyard, Sausalito, Calif., completed the first of several water taxi speed boats for the Crowley Launch & Tugboat Company of San Francisco, last month. The boat is of wood construction, with capacity for 100 persons, and attains a speed of 25 knots.

Diesel Tugs.—Great Lakes Engineering Works, River Rouge, Mich., has been awarded a contract by the Ford Motor Company, Detroit, Mich., for the construction of a 500 shaft horsepower diesel-electric tugboat.

The tug was designed by Henry J. Gielow, Inc., 25 West 43rd Street, New York. She will be 75 ft. between perpendiculars, 21 ft. beam, 12 ft. loaded draft. Cooper-Bessemer diesel engines have been ordered.

Bids Called on Towboats.—The Inland Waterways Corp., 1016 Munitions Bldg., Washington, D. C., on April 18 opened bids for the construction of two shallow-draft,

twin-screw diesel towboats. The government is to supply the 1000-horsepower diesel engines and auxiliaries for these vessels.

Navy Yard Busy.—Mare Island Navy Yard, on San Francisco Bay, reports sufficient repair work to keep the yard force busy for the next three or four months. The mine sweeper Tern, destroyer Alden, and the refrigerator ship Arctic are recent arrivals at the yard for repairs. The Arctic is due for an extensive overhauling.

Derrick Boat.—Midland Barge Co., Midland, Pa., has a recent order from the U. S. Engineers' Office, Huntington, W. Va., for a 15-ton derrick boat.

Launch Ordered.—Nashville Bridge Co., Nashville, Tenn., has an order from the U. S. Engineers, Pittsburgh, for a gas launch 40 by 8 by 8 ft.

Fire Boat Ordered.—Davie Shipbuilding & Repairing Co., Ltd., Lauzon, Quebec, has been awarded contract by the Canadian Government at Ottawa for the construction of a new fireboat for use in Quebec Harbor to cost \$229,000. The boat is to be 127 ft. over-all and powered by diesel engines. (Report from Asst. U. S. Trade Commissioner Wm. P. Sargent, Jr., Montreal, Canada.)

All-Welded Tanker.—The all-welded steel tanker Lucy was launched recently at the yards of Brewer Drydock Company at Mariner's Harbor, Staten Island, N.Y., for the Reinauer Transportation Company of Kearny, N. J.

She will be engaged in carrying gasoline from the refineries of Cartaret, N. J., to distributing stations on Long Island Sound. Every year each of these vessels travel over 30,000 miles which is equivalent to a trip around the world.

Two Westinghouse arc-welding sets were used in building this all-welded vessel, which is the largest welded tanker ever built in the port of New York, and is 147 ft. 6 in. long; has a beam of 26 ft.; and a depth of 12 ft. She has a capacity of 230,000 gallons. She was built by the R. F. Smith Lock-Notch Welded system of construction. She will be propelled by a 400-horsepower Ingersoll-Rand diesel engine.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of April 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W., Seattle, Wn.
North Star, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Bell St. Terminal, Seattle, for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1500 H.P. McIntosh & Seymour diesel eng.; 14 knots speed; launched 1/18/32, deliver 4/20/32 est.

GENERAL ENGINEERING & DRY DOCK CO., Oakland, Calif.

Purchasing Agent: A. Wanner.
Marshall C. Harris, hull 26, suction dredge for American Dredging Co., San Francisco; 150 L.B.P.; 45 beam; 12 depth; keel 11/23/31.

U. S. NAVY YARD, Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.
Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD, Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement, keel 9/1/31.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., LTD., Union Plant

Drydock, clean, paint, misc. repairs; m.s. Finnanger, str. Montebello, str. Ruth Alexander, str. Tahchee, Associated Oil Lighter No. 8, m.s. Molokai, str. President Harrison, m.s. Standard Service, str. S.C.T. Dodd, str. President Hayes, str. Point Salinas, str. Main, str. J. A. Moffett, str. R. J. Hanna, str. Maunawili. Caulk, rivet seams on starboard side; str. Ryrja Maru. Make and install four copper washers. Dock, clean, paint, yacht Talayha, launch Olympic. Install 3 body bound bolts, etc.; str. President Jackson. Pipe repairs; m.s. Trocas. Misc. repairs, dock for survey; launch Hermosa. Dock, bush stuffing box; launch Asama. Drydock, clean, paint, labor installing cores electrolysis eliminators; launch San Lucas. 2 cylinders for 8x10 capstan; str. C. J. Barkdull. Misc. repairs; s.s. Santa Mira, str. Watsonville, str. Nora, m.s. Silver Walnut, str. Torres, launch Excellent, m.s. Trocas, launch Geneva, launch Belle Isle, launch Anadir, str. President Wilson, m.s. Lio, str. Saramacca, S.S. C. J. Barkdull, str. San Mateo, str. Talamanca, str. President Jackson, str. La Perla, Point Brava

LAKE WASHINGTON SHIPYARDS, Seattle, Wn.

Remodeling and installing new diesel engine; Ferry Chippewa

THE MOORE DRY DOCK COMPANY

Misc. repairs and docking to: str. Manulani, Western Pacific Barge No. 1, str. Chas. L. Wheeler, Jr. Pennsylvanian, str. Melville Dollar, barge Evans, barge Iroquois, str. Dakotan, str. Golden Harvest, str. Kansan, schr. W. H. Smith, str. Oregonian, str. Georgian, tug Sea King, schr. Louise, str. West Isis, Western Pacific Barge No. 3, U.S.A.T. St. Michel, Standard Oil Barge No. 2.

PRINCE RUPERT DRY DOCK & SHIPYARD, Prince Rupert, B.C.

Docked, cleaned, painted, misc. hull and machinery repairs in connection with annual overhaul; str. Canadian Spinner. Misc. hull and machinery repairs in connection with annual overhaul; str. Prince Rupert. Docked, cleaned, painted, sea-cocks opened for inspection; launch Katherine B. Docked, cleaned, paint, misc. hull and engine repairs; 3 fishing boats. Misc. hull and engine work not requiring docking; 29 fishing boats.

TODD DRY DOCKS, INC., Harbor Island, Seattle, Wn.

Miscellaneous repairs and drydocking, str. Admiral Rogers. General repairs and dry-docking; str. Dorothy Luckenbach. Drydock, clean, and paint; str. Mary D. Drydock and misc. repairs; str. Norco, Otsego. Misc. repairs; str. Commander, str. Margaret Dollar, str. Nelson Traveler.

UNITED STATES NAVY YARD, Bremerton, Wn.

Misc. repairs and docking; Texas, Tennessee, Hale, Talbot. Misc. repairs; Arkansas. Misc. repairs incidental to operation as district craft; Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS Bath, Maine

Icarus, hull 152, twin screw, steel patrol boat for U. S. Coast Guard; 165 ft. long; diesel eng.; keel 7/22/31, launch 3/19/32; deliver 4/20/32 est.

Perseus, hull 153, same as above; keel 9/15/31; launch 4/11/32 est.; deliver 4/22/32 est.

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long, 35 knots speed.

Not named, hull 155, quarantine tug for U. S. Public Health Service, Boston; 60 ft. long, 15 beam, 7 ft. depth.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington, D.C.; 131 long 24'6" molded beam; 8'6" molded draft; 500 H.P. eng.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,

Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement, deliver 8/15/32 est.

Monterey, hull 1441, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 10/12/31, deliver May/32 est.

Lurline, hull 1447, sister to above, deliver Jan. /33 est.

Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 11/28/31; delivered 3/32.

Quirigua, hull 1445, sister to above; launched 2/6/32.

Veragua, hull 1446, sister to above; launched 12/12/31 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORP., LTD.,

Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co. 262x45x15 ft., McIntosh & Seymour diesels, launched 11/5/31.

Hull 4289, dredge hull for Ellicott Machine Co., Baltimore.

COLLINGWOOD SHIPYARDS, LTD., Collingwood, Ontario

Purchasing Agent: E. Podmore.

Wm. J. Stewart, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, T.E. engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam; keel 8/12/31.

DEFOE BOAT & MOTOR WORKS Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.

Not named, hull 149, cutter for U. S. Coast Guard, 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine, 1500 S.H.P.; 2 W.T. boilers; keel 12/15/31 est.; launch 4/15/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY,

Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock, 2 delivered.

Hull 1134, one 24 in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6"

Hull 1137, one steel hull cattle barge for Jersey City Stockyards, 210 x 36'6" x 8'; 1410 gr. tons.

Hull 1138, steel hull, 20-in. pipe-line, self-propelled, diesel-electric powered dredge for U. S. Engineers Office, St. Louis, Mo.

Hull 1139, same as above.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

ELECTRIC BOAT CO., Groton, Conn.

Cuttlefish, fleet submarine SS171 for U. S. Navy; deliver 12/29/33 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32.

Santa Paula, hull 122, sister to above; keel 8/4/31; launch 6/11/32 est.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel 3/24/32.

GREAT LAKES ENGINEERING WORKS

River Rouge, Michigan

Empire, hull 279, dredge hull for Dumbar & Sullivan; 125 x 42 x 10 ft.; keel 4/4/32 est.; launch 5/9/32 est.; deliver 5/31/32 est.

Not named, hull 280, diesel-electric tug for Ford Motor Co., Detroit; 75 L.B.P.; 2 beam; 12 loaded draft; 500 S.H.P.; keel 5/9/32 est.; launch 6/11/32 est.; delivery 7/15/32 est.

HOWARD SHIPYARDS & DOCK COMPANY,

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft.; keel 3/14/32 est.; deliver 8/32 est.

MARIETTA MANUFACTURING CO., Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6"; launched; deliver 5/1/32 est.

Captain William Clark, same as above; launched; deliver 5/1/32 est.

One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9"; launched; deliver 5/1/32 est.

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.; 132 x 35 x 10 ft.

MIDLAND BARGE COMPANY, Midland, Penn.

Eight floating steel caissons for Foundation Co.; 6 delivered.

One towboat hull for Earl Webster.

One 15-ton derrick boat for U. S. Engineers Office, Huntington, W. Va.

NASHVILLE BRIDGE COMPANY, Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 260, dredge for stock; 140 x 36 x 9'; keel 11/16/31; launched 2/13/32; delivered 3/31/32.

Hull 261, gasoline engined workboat for U. S. Engineers, Vicksburg; 31 ft. length; keel 3/16/32; launch 4/14/32 est.

Hull 262, same; keel 3/10/32; launch 5/2/32 est.

Hull 263, same; keel 3/10/32; launch 5/2/32 est.

Hull 264, work boat for stock 40 ft. length; gasoline engine; keel 3/1/32 est.; launch 4/6/32 est.

Not named, hull 265, gas launch for U. S. Engineers, Pittsburgh; 40 x 8 x 8 ft.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Chiriqui, hull 346, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 4/27/31; launched 11/14/31; delivered 3/18/32.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31.

Colombia, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/29/32; launch 8/32 est.; deliver 12/1/32 est.

Haiti, hull 348, sister to above; keel 4/4/32; launch 9/32 est.; deliver 12/15/32 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31; launched 1/9/32; deliver 4/22/32 est.

Acadia, hull 351, sister to above; keel 8/31/31; launched 2/13/32; deliver 6/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO. Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31; deliver in fall 1932.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launched 12/5/31; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31; launch 9/32 est.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31.

SPEDDEN SHIPBUILDING CO., Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.; 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng.; keel 3/15/32; deliver 10/31/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY, Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 146 single-screw steamship for carrying loaded railway cars for Seatrains Lines, Inc., New York and New Orleans; 464'6" by 63'6" by 38'3"; 15½ knots speed; 8500 D.W.T.; keel 2/24/32; deliver 9/32 est.

Not named, hull 147, sister to above; keel 2/24/32; deliver 9/32 est.

UNITED DRY DOCKS, Inc. Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Berwind-White Coal No. 100, hull 806, barge for Berwind-White Coal Mine Co.; 130 L.O.A.; 35 beam; 12'6" depth; keel 12/28/31; launched and delivered 4/4/32.

Hull 807, scow for City of New York; 70 L.O.A.; 30 beam; 7'6" depth; keel 1/18/32; launch and deliver 5/16/32 est.

Piermont, hull 808, ferryboat for Rockland Boat Corp.; 64'10" L.O.A.; 29' beam; 8'6" depth; 70 H.P. diesel eng.; keel 2/3/32; launched 3/5/32; delivered 3/12/32.

Irvington, hull 809, sister to above; keel 2/10/32; launch 4/6/32 est.; deliver 4/15/32 est.

U. S. NAVY YARD New York.

New Orleans, light cruiser CA32, for U. S. Navy; 10,000 tons displacement; deliver 6/2/33 est.

U. S. NAVY YARD Philadelphia, Pa.

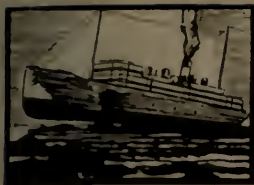
Minneapolis, light cruiser CA36 for U. S. Navy; 10,000 tons displacement; deliver 10/2/33 est.

U. S. NAVY YARD Portsmouth, Va.

Dolphin, fleet submarine SS169 for U. S. Navy; deliver 8/1/32 est.

Cachalot, fleet submarine SS170 for U. S. Navy; deliver 9/16/33 est.

Cargoes in Movies.—After sixty-five successful showings in the San Francisco bay cities during the past three months, "Intercoastal Cargo," the American-Hawaiian Steamship Company's all-talking movie was sent to the Los Angeles district for a month's showing. According to J.R. Fitzgerald, district manager of the American-Hawaiian at San Francisco, "during the first three months of this year we have shown the film here and on the Atlantic Coast more than one hundred times to many thousands of interested spectators at traffic clubs, luncheon groups, lodges, business schools, and numerous other organizations." The film tells the story of intercoastal shipping by water and the handling and stowage of the cargo a-la-American-Hawaiian, and some very interesting views of the ports of call, with sounds!



Marine Insurance

Edited by James A. Quinby

Valuation in Cargo Policies

Underwriter May Have no Right to Question Value Stated in Open Policy Certificates

IN most forms of insurance, the valuation stated or assumed in the policy has little or no bearing upon the amount recoverable in case of loss. Any disillusioned holder of a fire or automobile policy can tell you, with tears in his eyes, how the scheming underwriter insured his 1892 house or 1913 Ford for ten thousand dollars and then, when loss occurred, would only pay him the bare replacement value.

Marine insurance has developed on different lines, allowing either valued or unvalued policies. Probably the best definition of these classes of insurance is found in the British Marine Insurance Act, Sections 27 and 28, reading as follows:

Section 27:

- (1) A policy may be either valued or unvalued.
- (2) A valued policy is a policy which specifies the agreed value of the subject matter insured.
- (3) Subject to the provisions of this Act (e), and in the absence of fraud, the value fixed by the policy is, as between the insurer and the assured, conclusive of the insurable value of the subject intended to be insured, whether the loss be total or partial.
- (4) Unless the policy otherwise provides, the value fixed by the policy is not conclusive for the purpose of determining whether there has been a constructive total loss.

Section 28:

An unvalued policy is a policy which does not specify the value of the subject-matter insured, but, subject to the limit of the sum insured, leaves the insurable value to be subsequently ascertained, in the manner hereinbefore specified.

Policies on hulls are almost always valued policies, and, in case of total loss from a peril insured against, the underwriter must pay the full insured value unless he can show that the valuation was fraudulent. Excessive valuation may be, but is not necessarily, evidence of fraud. As hull policies are ordinarily time policies,

Seattle

From your snows of mountain and garland of pines
Your frontier spirit goes forth.
You are tied to the south by your boundary lines
But your face is set to the north
In tune with its deep-watered, snow-girdled sounds,
At home to its roistering men
Who pause in their far-flung venturesome rounds
To lust for your charms again.
Here's strength to the clasp of your friendly hand
And a toast for your destiny—
A well-trained and dutiful wife of the land,
But mistress yet to the sea

J A Q

a sudden fluctuation in the hull market, such as that occasioned by a war or by overproduction and consequent depression following a war, logically results in insurance payments which fall short of or exceed indemnity to the shipowner.

Open Cargo Policies

In the early days of cargo insurance, when each shipment was a separate risk, the distinction between valued and unvalued policies involved little difficulty. If a policy provided that the goods were valued and in-

sured at \$100, the underwriter paid \$100 in case of total loss. If the policy provided the goods were to be valued at invoice or at market value, the assured had to prove such value before recovering a loss under his policy.

Under modern conditions, however, practically all cargo is insured by what are known as open or contract policies, which are designed to cover all goods which shall be shipped for the account of the assured, at invoice price, or destination sales price, or some other technically unvalued standard. From time to time, declarations are sent in by the assured giving particulars of individual shipments, and certificates are issued by the underwriter in accord with the particulars so given.

As declarations under open policies may be made even after loss occurs, it may readily be seen that this system places the insurer at the mercy of the cargo owner in respect to the alleged value of the goods.

Can Insurer Question Value after Loss?

An intimation that the value alleged in the declaration is conclusive for all purposes is contained in a recent decision of the United States District Court (New York) in the case of *St. Paul Fire & Marine Insurance Company vs. Pure Oil Co.* (1923 A.M.C. 432).

It seems that the oil company took out an open policy with the St. Paul, covering oil shipments "valued, premium included, at sales price at port of destination on date of sailing." Upon receipt of a declaration giving particulars and value of a certain shipment, the underwriters issued a certificate covering, under and sub-

A Fireman's Fund Marine insurance policy DEPENDABLE HULLS • FREIGHTS • DISBURSEMENTS FIREMAN'S FUND

NEW YORK
116 John Street

CHICAGO
Insurance Exchange

ATLANTA
Hurt Building

SEATTLE
309 Colman Bldg.

HEAD OFFICE

ject to the conditions of the open policy, "\$107,729 on one-half interest on 78346.36 bbls. Mexia crude oil, valued at \$215,458 (\$2.75 per bbl.)."

The ship carrying this particular consignment was in collision, as a result of which she lost a portion of the oil. Claim was made under the policy for the oil so lost at \$2.75 per barrel. The insurers called for details. They were told that there was no invoice covering the goods, but that the figure of \$2.75 had been reached by taking a value of \$1.60 at the oil field and adding freight and insurance. This satisfied the underwriters and the claim was paid in full.

The underwriters then proceeded against the colliding vessel, which was subsequently held liable for the loss. There proved to be a fly in the ointment, however, for the underwriters could prove a value of only \$2.19 per barrel. The difference arose from the fact that the proved market value of the oil at the field was \$1.00 per barrel, instead of \$1.60 as alleged by the assured. The insurers thereupon brought suit against the assured for \$7820.14, representing the difference between the field values of \$1.00 and \$1.60. The suit was based upon the assertion that the money had been paid under a mistake of fact.

The court held that the policy and certificate formed a valued policy, and the insurer could not recover any part of the loss paid at the declared value. An extract from the court's opinion reads as follows:

"The original policies here were open and unvalued. No definite value is laid down in them; being blanket policies, they could not in the nature of things set forth values in specific sums. But it seems equally obvious that the certificates were valued. They provide in plain words that one-half interest in the particular cargo is insured for \$107,729, the total shipment being 'valued' at \$215,458 or \$2.75 per bbl. The mere insertion of the amount of insurance, \$107,729, does not render the insurance valued, *Snowden vs. Guion*, 101 N. Y. 458; *Williams vs. Continental Insurance Co.*, supra; but the addition of the valuation clause, setting forth both a value on the entire shipment and a value on each barrel, does have that effect. Policy and certificate combined make up the contract of insurance. *New York & Oriental Steamship Co. vs. Automobile Insurance Co.*, 1929 A.M.C. 360, 32 F (2d) 310, affirmed in 1930 A.M.C. 328, 37 F (2d) 461; *Brandyce vs. Globe & Rutgers Fire Insurance Co.*, 1930 A.M.C. 7, 252 N.Y. 69. In any feature wherein the two are in conflict, the certificate, issued later, is deemed a modification of the blanket policy and is controlling. *St. Paul Fire & Marine Insurance Co. vs. Balfour*, 168 Fed. 212; *Royster Guano Co. vs.*

Globe & Rutgers Fire Insurance Co., 1930 A.M.C. 11, 252 N. Y. 75. It follows that the insurance on the oil was valued insurance. There being no claim of fraud, the insurers are not entitled to recover any part of the payments made to the insured on the ground of an innocent overvaluation of the oil."

Can the Insurer Protect against Overvaluation?

It is difficult to see how the underwriter in this case could have protected himself against the inflated payment. Presumably the court would have required payment at the figure of \$2.75, even if the insurer had not been satisfied with the proofs of value after the loss. The policy would have been considered a valued policy in a suit to recover a loss, as well as in a suit to recover back a loss once paid. Obviously it is impracticable to require absolute proof of value before issuing each certificate under an open policy, and yet, under the somewhat inequitable holding of the case herein discussed, such a course offers the only method by which an underwriter can protect himself.

There is one obvious change in the open policy, however, which would render the insurer proof against such inflated losses. He need only introduce into that document a clause providing that the values set forth in the declarations are merely descriptive and that, in case of loss, the assured must prove the correctness of such values. Yeah—just try and do it, and see what the assured says.

Intoxicated Deviation

THE effect of the liquor problem on a ship's liability for damage to cargo was set forth in an opinion handed down by the Circuit Court of Appeals for the Ninth Circuit on March 21, 1932, in the case of *The Hermosa*.

It seems that the original libelants in the case were owners of a shipment of fresh tomatoes which the good ship *Hermosa* was to transport in her refrigerated hold from Topolobampo, Mexico, to Los Angeles Harbor. The charter-party under which the full load of tomatoes was to be carried provided that the vessel should be "immediately despatched" after loading.

Instead of proceeding immediately upon her voyage, the *Hermosa* delayed at Topolobampo from noon of May 11, 1929, until 3 p.m. the following day, when she proceeded. About 10:30 the following morning, a valve seat in the main engine circulating pump broke, interrupting the cooling of the engine, and necessitating the use of

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the general service pump for engine cooling during the remainder of the trip. This left the refrigerating plant without a pump, and the resulting high temperature of the hold caused damage to the tomatoes.

The trial court (1931 A.M.C. 1075) held that the ship was unseaworthy in several respects, including a defective refrigerating plant, failure to carry spare valve seats, and having an incompetent and irresponsible master. Upon appeal, the decision against the ship was affirmed, but solely upon the ground that the delay in sailing constituted a deviation.

The testimony at the trial showed that the master of the *Hermosa* was entirely responsible for the delay at Topolobampo. At about 11 a.m. on May 11, according to the evidence submitted, the good skipper (whose name, by the way, was Rookus) went ashore and succumbed to the blandishments of the village. In short, he achieved that superior state of inebriation which, under the old army tests, required that the patient hold on to the grass to keep from falling off the earth. The able commander of the *Hermosa* continued in this enviable state until 3 p.m. of the following day. At that time, recites the opinion, "The master, still incapacitated, was assisted on board, and the vessel sailed for Los Angeles Harbor under the direction of one of her crew."

The court found that the delay of twenty-seven hours constituted a deviation which rendered the vessel liable for the ensuing damage. The appellate court's opinion is very thorough, and contains numerous excerpts from leading cases and tests, the following citation from Carver's *Carriage of Goods by Sea* (6th Ed. Sec 287) being typical:

"When a vessel has deviated from her proper course, the shipowner is not only liable for the delay, but he becomes responsible for any loss or damage that happens to the goods. He is not protected by the exception of perils in the contract. Thus in *Thorley vs. Orchis Co.*, 76 L.J., K.B. 595) locust beans were shipped in a vessel described as 'lying at Limassol and bound for London.' The vessel did not proceed direct to London, but went out of her way to two ports in Asia Minor; on arrival in London, the beans were damaged through the negligence of the stevedores; the shipowners were held liable notwithstanding an exception of such negligence in the bill of lading. There is no need, the Court held, to show that the loss which has occurred is traceable to the deviation. A deviation is such a serious matter and changes the character of the voyage so essentially, that a shipowner who has been guilty of a deviation cannot be considered as having performed his part of the bill of lading contract but something funda-

mentally different, and therefore he cannot claim the benefit of stipulations in his favour contained in the bill of lading."

Sea Water Versus Sea Peril

ALL texts on marine insurance, without exception, follow Arnould in stating that not every peril on the sea is a peril of the sea and it is only the latter which is covered by the ordinary marine policy. This vague statement is difficult of practical application. The average cargo underwriter, for example, will pay damage caused by salt water, but will deny liability for damage due to fresh water. And yet courts have made holdings which are exactly opposed to this practice.

The most recent decision on the point occurs in *The Byron*, (1932 A.M.C. 486), a memorandum opinion by one of the lower trial courts of New York. In that case, a bale of rugs consigned to the plaintiff was found damp and greenish inside when delivered. When tested, the dampness reacted as salt water. The consignee sued his underwriter, asserting the right to recover as for a peril of the sea under his ordinary marine cargo policy.

It was conceded that the vessel was seaworthy. The court held that the seaworthiness of the vessel and the fact that the damage was occasioned by sea water did not suffice to prove the plaintiff's case, and the complaint was dismissed. The court apparently relied largely upon the somewhat doubtful authority of *Cary vs. Home Ins. Co.*, 1923 A.M.C. 438, a case holding that there can be no recovery under a hull policy for a leaky scow which capsizes in calm weather.

Mixed Cargo

In accord with the progressive spirit of the times, the Harbor Tug & Barge Company, one of the foremost bay and river transportation concerns on the Pacific Coast, has determined to equip its vessels and branch offices with short wave wireless sets, which will be operated in conjunction with telephones to insure ready communication between vessels of its fleet at all times.

It has recently been decided that admiralty courts have jurisdiction of a claim of a vessel for damage to

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a dike in the Delaware River completely surrounded by water; (1932 A.M.C. 440). We suppose the next result of this line of jurisdiction of holdings will be to the effect that an island is subject to maritime authority because it is completely surrounded by water.

The Study Class of the Association of Marine Underwriters of San Francisco has offered to its members a series of singularly interesting lectures during the last two months.

At the meeting of February 8, Ira S. Lillick, of the admiralty law firm of Lillick, Olson & Graham, discussed the present status of the Hague Rules, and the prospects for the adoption in the United States of the uniform bill of lading. At the same meeting Clayton E. Roberts, San Francisco manager of the Home Insurance Company of New York, gave an interesting talk on underwriting conditions at Gulf ports. Mr. Roberts was marine manager for the Home at New Orleans for several years, and his comment upon towage and river traffic conditions proved extremely interesting.

At the meeting of March 7, the distinctions between the York-Antwerp Rules of 1890 and those of 1924 were outlined in brief by Walter Vivell of Cosgrove & Co. Mr. Vivell's talk was followed by a showing of motion pictures covering the steamship Colombia and steamship Munleon disasters, through the courtesy of Merritt

Chapman & Scott and Arnold Bowhay of the Fireman's Fund Insurance Company.

The meeting of March 21 featured Hunt C. Hill, of the admiralty law firm of Resleure & Hill, in a discussion of the hull underwriter's liability under the Inchmaree clause. The second speaker of the evening was Captain Leighton Robinson, who favored the Class with a rich and colorful description of the early history of shipbuilding.

On April 4 Dr. E. R. De Ong delivered a talk upon heat, moisture, and insect damage to ocean cargoes. His remarks dealt chiefly with infestation of grain and other cargoes by the common insect pests encountered on the Pacific Coast. At the same meeting a most interesting series of motion pictures covering the tuna fishing industry was shown by Warren McKibben of the California Packing Corporation.

C. A. Bonner, western branch manager of the affiliated Aetna Life companies, recently returned to San Francisco on board the steamship Virginia of the Panama Pacific Line. Mr. Bonner was gone for five weeks, during which time he visited the company offices at Chicago and the home office at Hartford, Connecticut. Mr. Bonner is head of the marine underwriting activities of the company for the Northwest Zone.

Freights, Charters, Sales

April 14, 1932

THE following steamers have been fixed with grain to U. K.: British steamer Janeta, Vancouver, B. C., to Leith, 24-, April, Canadian American Shipping Co.; British steamer Langleegorse, Vancouver, B. C., to Antwerp and Rotterdam, 23/6, April, Dale & Co.; British steamer Brighton, Vancouver, B. C., to Hull, April, Dale & Co.; British steamer Dalfram, Vancouver, B. C., to U.K. Cont., Bordeaux Hamburg Range, 24-, April, Wm. H. Pim, Jr.; British steamer Kafiristan, Vancouver, B.C., to Antwerp and Rotterdam, April, Dale & Co.; British steamer Koranton, Vancouver, B.C., to London, May,

Dale & Co.; British steamer Tiber-ton, Vancouver, B.C., to Avonmouth, April, Dale & Co.; British steamer Imperial Valley, Vancouver, B.C., to U.K. Cont., Bordeaux Hamburg Range, 23/9, April, Kerr, Gifford & Co.; Norwegian motorship Belmorra, British Columbia to U.K. Cont., April, Canadian Transport Co.; British steamer Salmonpool, Vancouver, B.C., to London, 22/6, April; British steamer Welsh City, Vancouver, B.C., to U.K. Cont., Bordeaux Hamburg range, 23-, April; May, Canadian American Shipping Co.; Greek steamer Archangelos, Vancouver, B.C., to U.K. Cont., Bordeaux Hamburg range, May; British steamer Kurdistan, Vancouver, B.C., to U.K. Cont., May, Dale & Co.; British steamer Rajahstan, Vancouver, B.C., to Hull, May.

The following time charters have been reported: British motorship Cressington Court, 1 trip, delivery Shanghai, redelivery U.K. Cont., Bordeaux Hamburg range, via North Pacific, 5-, March, Canadian Transport Co.; British steamer Vernon City, 1 trip, delivery British Columbia, redelivery St. Lawrence, April May, Strange & Co.; British motorship Bonnington Court, 1 trip, delivery Shanghai, redelivery U.K. Cont., via North Pacific, March, W. L. Comyn & Sons; British steamer Uffington Court, 1 trip, delivery Milwaukee, redelivery U. K. Cont., via North Pacific, 3/9, April, Canadian Transport Co.

The following sales have been reported: American steamer Caspar, Caspar Lumber Co. to Delta Dredging Co.; American steamer Cotten-eva, C. W. Goodyear to Emil Stahlbaum; American Sc. William H. Smith and American Sc. Aurora, The Charles Nelson Co. to H. J. Cochran, Monterey; American Sc. Dunsyre, Norman L. Hawkins to John H. Hawkins.

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Trade Notes

Marine Paint.—Cuthbert Hague, widely known in Atlantic Coast marine and industrial circles, has been appointed manager for the American Marine Paint Company on the Atlantic seaboard, with headquarters at 11 Broadway, New York City, it is announced by J. M. Botts, president of the American Marine Paint Company.

Complete stocks of anti-corrosive and anti-fouling Germicide compositions are carried as well as a complete stock of marine paints and varnishes.

Hague's territory serves all principal maritime points throughout the Atlantic Coast range.

New Agency.—Carl V. Lane, Bal-four Building, San Francisco, representative of numerous established lines of marine engine room and deck equipment, is now sales representative of the U. S. Metallic Packing Company of Philadelphia. Experienced in all engineering conditions, Carl Lane is now prepared to assist engineers in solution of their packing problems.

Terminal Agent.—H. B. Mills, president of State Terminal Co., Ltd., San Francisco, announces appointment of Lester H. Cloud as Contracting Agent. Mr. Cloud has been connected with various steamship interests in San Francisco for many years, most recently as assistant traffic manager for the General Steamship Corporation and his wide acquaintance with shipping and with shippers on the Pacific Coast should be of great value in his new connection.

Plywood Distributor.—Haskelite Manufacturing Corporation announces appointment of White Brothers, hardwood lumber dealer of San Francisco, as its distributor in the San Francisco Bay territory, handling both Haskelite Plywood and Plymetl. At present White Brothers carry a stock of both materials.

Haskelite Corporation is represented on the Pacific Coast by the California Panel and Veneer Company of Los Angeles.

Rubber Bottom Coating.—Last month at the Fletcher Plant of United Dry Docks, Inc., in Hoboken, a new development of great interest to ship and boat owners was demonstrated. At this time the New York Harbor Supervisor's patrol

boat Argus was covered below the water line with Seavulc, the new liquid rubber. The application created considerable interest along the docks and was witnessed by shipping and boat men from all parts of the Port of New York.

Promotion.—The Electric Storage Battery Company of Philadelphia announces the promotion of Frank Kalas to the position of Assistant General Sales Manager. Mr. Kalas was formerly district manager for this manufacturer of Exide batteries.

Mexican Agent.—Lincoln Electric Company of Cleveland, manufacturer of "Stable Arc" welders and supplies and "Line-Weld" motors, has announced that it has appointed La Consolidada, S. A., as its Mexican distributors. This firm is one of the largest steel manufacturers in Mexico and the foremost advocate of arc welding in that republic. It is a branch of the Isaac Joseph Iron Company of Cincinnati and was organized in 1907.

Coast Agent.—King-Knight Company, sales representatives at San Francisco, for a number of marine engines and other marine equipment, have recently been appointed sales agents for the Coppus Engineering Corporation of Worcester, Mass. This company manufactures the Vano Blower, for undergrate or forced draft for stokers, as blower and exhauster for industrial ventilation, for blast furnaces, for other applications where circulating of air or gases is required.

Oil Burner Show.—The General Electric Company featured a new line of capacitor motors at the American Oil Burner Show held in Boston last month. Fractional horsepower motors and control, transformers, capacitors, as well as laboratory apparatus, were on exhibit.

New Branch.—Babcock & Wilcox Tube Co., Beaver Falls, Pa., has announced opening of a new branch office in the Ford Building, Detroit, Mich. J. E. Polhemus is in charge of the territory as District Sales Manager. He was formerly assistant vice-president and district sales manager in Detroit for Associated Alloy Steel Co.

G-E at Panama Canal.—Engineers of the General Electric Company, which equipped the locks of the Panama Canal nearly twenty years ago, will participate in the new Panama construction exploit—the building of a four-million-dollar dam across the Chagres River. Electric motors of 100 horsepower are to move two tall cableway towers on each bank of the river, and a motor of 400 horsepower will propel a 20-ton bucket for excavating and concrete work.

This reservoir will enclose more than 22 billion cubic feet of water and will control the volume of water supplied to the canal locks by the river, thus making it possible to pass a larger number of vessels through the locks. The dam will also be the site of a hydro-electric power plant to contain two General Electric 10,000-kilowatt generators.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912 OF PACIFIC MARINE REVIEW, published monthly, at San Francisco, Calif., for April 1, 1932, State of California, County of San Francisco—ss.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Bernard N. DeRoche, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Jas. S. Hines, 500 Sansome Street, San Francisco, Calif.

Editor, Alex J. Dickie, 1036 Mariposa Ave., Berkeley, California.

Managing Editor: None.

Business Managers: Bernard N. DeRoche, 737 Contra Costa Avenue, Berkeley, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

James S. Hines, owner.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona-fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. (Circulation information is required from daily publications only.)

BERNARD N. DE ROCHE.

Sworn to and subscribed before me this 1st day of April, 1932.

(Seal) M. V. COLLINS
Notary Public, in and for the City and County of San Francisco, State of California.

(My commission expires April 14, 1933.)

Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER



M. J. Buckley, Dollar Lines freight chief, guest of honor at important New York shipping conclave. "Jim" Botts also represented Pacific deepwater.

Chiselers Club. With President James E. French of Lloyds in the chair, seventy-five members of The Chiselers Club recently dined and discussed deepwater destinies at the Engineers Club in New York. M. J. (Mike) Buckley, freight traffic manager of the Dollar Steamship Lines, home port San Francisco, is the representative of the West Coast in this Atlantic clan, and the gathering was in his honor. J. M. (Jim) Botts, president of the American Marine Paint Company, was an honored guest. Welfare of merchant shipping was the keynote of all remarks, and particular applause followed the interesting talk on American shipping problems by Herman Esselborn of the Standard Shipping Company.

Engineer at Post. W. W. Bowers, formerly chief engineer of the Panama Mail liner Santa Teresa, is standing by the steamship Santa Rosa, recently launched for the Grace Lines Panama Mail Service by the Federal Shipbuilding & Drydock Company, Chester, Pennsylvania. Chief Bowers is overseeing the installation of the machinery aboard this vessel and he will be in charge of the engine room when the

vessel is commissioned next September.

Replacing Chief Bowers on the Santa Teresa is Victor D. Paso, formerly first assistant.

Commands Flagship. Captain A. B. Randall was in command of America's largest liner, the Leviathan, when she sailed from New York April 26 for Plymouth, Cherbourg, and Bremen on her first transatlantic voyage following a complete overhaul and redecorating, it was announced recently by A. J. McCarthy, general manager of the Roosevelt Steamship Company of New York, which acts as general agent for the United States Lines.

Other members of the Leviathan's staff of officers are Captain Schuyler L. Cummings, staff captain; John I. Fagan, chief engineer; James G. Summitt, purser; and Dr. Frank Stewart, chief surgeon. David Robertson, former chief steward of the President Roosevelt has been transferred to the Leviathan in that capacity.

All of these men are transatlantic veterans and are well known to regular travelers on United States Lines vessels.

Captain Randall, who is also commodore of the United States Lines fleet, has been master of the Leviathan since January, 1931, and has also commanded the America, George Washington, and Republic. Purser Summitt has been in the Leviathan since 1925.

Trustees and Officers Reelected.

At the annual meeting of the stockholders of the United States Shipping Board Merchant Fleet Corporation, held April 20, 1932, the following were reelected as Trustees: Elmer E. Crowley, S. S. Sandberg, H. I. Cone, A. H. Denton, Jefferson Myers, and R. K. Smith.

Immediately following the annual meeting, the Board of Trustees, at a special meeting, reelected the following administrative officers of the corporation: Elmer E. Crowley, president; S. S. Sandberg, vice-president; Samuel Goodacre, secretary; Heber M. Wells, treasurer; Lewis D. Parmelee, general controller.

Captain Sandberg had shortly before been elected vice-chairman of the Board to fill the place left vacant by the death of E. C. Plummer.



Oceanic Line's net houseflag—top half red, lower half blue, white center. Chief Officer F. E. Trask (left) and Captain J. M. Beck, new master (right) of S. S. Ventura very kindly displayed the colors for us.

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Ship.	Leave Oakland	Leave San Francisco	Leave Los Angeles	Arrive New York	Arrive Philadelphia
*†Charcas.....		May 7	May 9		
*Santa Elisa.....	May 9	May 11	May 12	June 4	June 6
*Santa Teresa.....	May 23	May 25	May 26	June 18	June 20
*†Curco.....		May 29	May 31		

Westbound

Ship	Leave Philadelphia	Leave New York	Arrive San Francisco	Arrive Oakland
*Santa Elisa.....	Apr. 13	Apr. 16	May 7	May 8
*Santa Teresa.....	Apr. 27	Apr. 30	May 21	May 22
*Santa Cecilia.....	May 11	May 14	June 4	June 5

†Manzanillo, Acapulco (optional) Champerico, San Jose de Guatemala, Acajutla, La Libertad, Anapala, La Union, Corinto, San Juan del Sur, Puntarenas, Balboa (optional).

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Veteran Retires. The Canadian Pacific Railway Company has announced the retirement of Captain Samuel Robinson, C.B.E., R. D., R. N.R., hero, while commander of the Empress of Australia, of the Yokohama earthquake and fire in 1923. He has served with the Canadian Pacific Company since 1895.

Captain Robinson warped his latest command, the liner Empress of Japan, into her berth at Pier B, Vancouver, for the last time on April 4, and a host of his friends from the marine fraternity at Vancouver and Victoria crowded his cabin to say farewell.

Captain Robinson, who will be 62 this month, entered the Canadian Pacific service 37 years ago after a sailing ship training in his native England. He has commanded every Canadian Pacific liner on the Pacific since that time, with the exception of the Empress of China.

Carrying the King and Queen of Siam from Yokohama to Victoria on the Empress of Japan in the record breaking time of 7 days, 20 hours, 16 minutes, he received from the King of Siam the decoration of the Order of the White Elephant of Siam. He also holds the decoration of the Order of Commander of the British Empire from King George V and numerous other medals and commendations for his meritorious work during the Japan earthquake and at other times.

Captain Robinson plans to spend his leisure in gardening, golf, and motoring.

New Pilot. Captain John McClements has been appointed San Francisco Bar Pilot to fill the vacancy left by the death of Captain Judson. The appointment becomes effective May 1.

Captain McClements was born in Ireland and went to sea in sailing ships while still a young lad. He has been with the Dollar Steamship Company for the last twenty years, and is one of the most popular skip-pers in the Port of San Francisco. His many friends and acquaintances are pleased to hear that the Governor has appointed him to this berth.

Quite characteristic of the man was his statement to a San Francisco newspaper reporter in refusing to give him his picture to publish in connection with the announcement of his appointment as a Bar Pilot. He said that nobody wanted to look at a piece of mahog-



Friends crowded his cabin at Vancouver when Captain Samuel Robinson retired from the sea on April 4. He had served Canadian Pacific since 1895.

any unless it was rubbed down and varnished, and he did not propose to have that done to his mug.

Inspector Tibbetts. Captain John P. Tibbetts, who has been in the U. S. Steamboat Inspection Service since 1917 as an assistant inspector of hulls, was last month sworn in by Supervising Inspector J. K. Bulger as local inspector at San Francisco of hulls—to work with Joseph P. Dolan, inspector of boilers.

During the World War, Captain Tibbetts was a lieutenant-commander in the Navy and had command of the Saturn in Alaskan waters and the West Eldara on a trip to the Golden Horn with flour for the Turks. He has served with both the old Pacific Mail and the Oceanic lines. He is a native of Eureka.

Monterey Personnel. The Matson Navigation Company has announced the names of the Matson and Oceanic employees who have been assigned to carry on the good name of the Oceanic Line in point of ser-

vice for the Steamship Monterey which will sail from New York on May 12 on her maiden voyage to San Francisco, and will depart from San Francisco on her regular schedule to ports of New Zealand and Australia on June 3.

Among the officers are many veteran employees well known to Pacific travelers. They are:

Master—Captain Andrew G. Townsend.

Deck department—R. J. Melanphy, chief officer; C. Hansen, first officer; H. B. Ferris, second officer; G. C. Streng, third officer; A. M. Gordeney, junior officer; H. W. Geyer, junior officer.

Engine department—H. T. Keene, chief engineer; K. M. Miller, first assistant engineer; W. Lindblom, second assistant; C. Wait, third assistant; G. B. Benasco, fourth assistant.

Purser's department—J. C. Fischbeck, supervising purser; Tim Carroll, purser; D. T. McHigan, assistant purser; D. S. W. Smith, assistant purser.

Medical department—Dr. S. B. Wakefield, Surgeon.

Steward's department—G. C. Tognotetto, chief steward; Walter L. Clark, second steward; A. Willan, third steward; Joseph Presser, chief steward cabin class; L. Wunderling, head waiter; Ernest Hunziker, chef.

Wireless department—D. S. Scherrer, chief radio operator; R. D. DuBois, second operator.

Captain Townsend was formerly commander of the Ventura and Maui. Chief Engineer Keene was formerly chief of the Malolo and Maui. Supervising Purser Fischbeck served on the Malolo and Matsonia; Purser Tim Carroll was in the Oceanic Line service; Dr. Wakefield was on the Sonoma; Chief Steward Tognotetto was on the Maui; and Cabin Class Steward Presser is a veteran of the Oceanic Line.

Error Corrected. Last month we reported that William Gilfillan, popular purser of the Panama-Pacific liner Virginia, was to forsake the intercoastal service to become purser on the Leviathan. Gilfillan wants it to be known that this is a mistaken rumor—and that he intends to stay on the New York-California run as long as he lives—or the company will continue to employ him.



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Atlantic - Far East

WEEKLY SAILINGS from New York. FORTNIGHTLY from Boston to Honolulu, Yokohama, Kobe, Shanghai, Hongkong, and Manila. FORTNIGHTLY SAILINGS from Manila, Hongkong, Shanghai, Kobe, Yokohama, Honolulu to New York and Boston.

*Transhipment New York.

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FORTNIGHTLY SAILINGS from Alexandria, Naples, Genoa, and Marseilles to New York, Boston, Los Angeles Harbor, San Francisco. Cargo destined Oakland, Portland, Seattle or Vancouver subject to San Francisco transhipment.

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FORTNIGHTLY SAILINGS between Boston, New York, Havana, Colon, Balboa, Los Angeles Harbor, San Francisco, Honolulu, Kobe, Shanghai, Hongkong, Manila, Singapore, Penang, Colombo, Suez, Port Said, Alexandria, Naples, Genoa, Marseilles, thence New York.

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*MAY 18 is the Big Date!
The Spring Jinks is the Big
Event!*

*LET'S top all previous jam-
bores!" say the entertain-
ment committee.*

*"Aye, aye!" say the Board of
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Cronin.*

*The main dining room of the
San Francisco Commercial Club
has been engaged. A palate-pleas-
ing banquet has been ordered. A
professional show of the revue
type of entertainment has been
signed aboard.*

*The jollification will be atten-
ded by every Propeller who can
arrange for "a night out."*

(Signed)

*Banquet Committee Chairman,
K. W. Ingraham.*

*Decoration Committee Chairman,
Jerry Lalor.*

*Entertainment Comm. Chairman,
Bert Anderson.*

*Reservation Committee Chairman,
Tom Forster.*

The Propeller Club of California, meeting for luncheon each Tuesday, at the California Room of the Commercial Club, San Francisco, continues to draw a large attendance at these affairs—and some very interesting and instructive speakers have been presented to the members during the past month. Briefly, these were:

April 5, L. L. Westling, assistant manager of the Engineering Department, Matson Navigation Company, presented a very interesting discourse on "Design and Construc-

tion of Modern Ships, with special Reference to the Mariposa."

April 12. Some new angles on the use of Wrought Iron were presented in very interesting fashion through the courtesy of H. K. Browning, divisional manager for A. M. Byers Co. of Pittsburgh. This presentation was in the form of a "movie" entitled "The New Story of Ancient Wrought Iron," showing ancient and modern processes and the making of ship plates and piping.

April 19. Professor W. F. Meyer, professor of Astronomy at the University of California, addressed the club on the subject "Astronomy, with Special Reference to its Relation to Navigation." This discourse was very interesting and well received.

April 26. "Know Your Navy" was the subject of a talk by Lieutenant-Commander Robert B. Carney, gunnery officer of the U.S.S. Cincinnati. The visit of Uncle Sam's fighting sea force, almost 188 ships, prompted this speaker to turn the attention of the members from the merchant to the naval marine for a short period. Lieut-Comdr. Carney is a brother of Propeller "Pat" Carney, also an Annapolis man.

New Members. Frank Burke, Charles E. Finney, Paul Curt von Gontard, Captain F. M. Edwards, L. L. Westling, O. L. Perkins, F. L. Fulton, Captain H. W. Rhodes, Captain Arthur H. De Guire, Herman D. Nichols and Charles Hopkins.

— PC —

The Spring Golf Tourney on the last day of March is an "histrionic" matter of record, but this is the first opportunity we have had to present the results. A record crowd turned out for the tournament at the Sequoyah Country Club; and after the serious business of keeping the eye on the ball and the ball out of the rough for eighteen holes, care was cast overboard and a splendid dinner served in the beautiful Sequoyah Club House. Winners and vanquished presented their sides of the story, and all hands voted this outing the "best yet." Note number of new names in the winning column!

Success of the day goes to C. M. "Dad" Le Count, chairman, and his committee—Vernon Showell, Russ Pratt, F. P. Ritchie, and Thomas Forster. Congratulations, boys, for a workmanly job!

Here's the box score!

	Gross	Handicap	Net	Won By	Prize presented by
Low Net	74	18	92	L. B. Stuart	Assistant of Tour
Round Up	75	23	98	Graham Stuart	Assoc. H. S. C.
Low Gross	76			Tray South	P. M. L. S. C.
Winner	77	17	94	FIRST FLIGHT	
Round Up	78	17	95	S. A. Livingston	G. T. F. C. D. D. C.
Winner	80	17	97	SECOND FLIGHT	
Round Up	82	18	100	Capt. F. A. Forster	Assoc. H. S. C.
Winner	84	18	102	T. P. R. R.	M. C. A. S. C.
Round Up	86	24	110	THIRD FLIGHT	
Winner	87	24	111	F. D. Brown	Assoc. H. S. C.
Round Up	89	24	113	J. T. Gentry	M. C. A. S. C.
Winner	90	27	117	FOURTH FLIGHT	
Round Up	92	27	119	Chas. Livingston	G. T. F. C. D. D. C.
Winner	93	27	120	C. F. Moore	Assoc. H. S. C.
Round Up	95	27	122	J. A. C.	G. T. F. C. D. D. C.
Winner	96	27	123	FIRST GUEST FLIGHT	
Round Up	98	27	125	L. H. Hays	Assoc. H. S. C.
Winner	99	27	126	D. P. R.	W. H. H. C.
Round Up	100	27	127	SECOND GUEST FLIGHT	
Winner	101	27	128	S. L. S.	G. T. F. C. D. D. C.
Round Up	102	27	129	L. I. S.	W. H. H. C.
Round Up	103	27	130	R. M. A.	G. T. F. C. D. D. C.

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American-Hawaiian Sports

By J. M. Pruner, *Sporting Editor*

THE American-Hawaiian Steamship Company's Bay district staff believes in the old saying "All work and no play makes Jack a dull boy," and, for the benefit of all, have arranged their forces in battle form to take on first class competitors in baseball, tennis, and golf.

Our baseball team is in better shape this year than ever before, and is in fine shape to take care of the Steamship tournament. Players as follows:

Manager, Cap.	R. Dallas
1st	M. S.
2nd	A. S.
3rd	I. P.
4th	I. K.
5th	T. H.
6th	B. E.
7th	M. M.
8th	F. Div.
9th	J. M.
10th	W. R.

There are a number of love making tennis players who are looking for singles, and here are a number of the players:

M. M.	H. T.
H. T.	A. T.
R. S.	R. S.
F. K.	I. K.
C. M.	C. M.
F. P.	F. P.
H. G.	H. G.
E. M.	E. M.
K. J.	W. W.
H. M.	I. H.
A. T.	I. M.
A. T.	M. S.
A. T.	W. R.
A. T.	A. M.

Golf seems to predominate with the boys as well as the girls from President R. D. Lapham down. Fifty-two players, including a number of guests "followed thru" the fairways of the Sonoma Mission Inn Country Club on April 24. A few of the boys who were fortunate in being let into the Mission Inn Hotel on Saturday night found during the tournament, as their scores indicate, that you cannot play night and day.

The first 4-some teed off 12:00 o'clock noon, and the last 4-some found the club house around 5:00.

When all players returned to the clubhouse, they found the attractive trophies arranged on a table by F. P. Ritchie and A. B. Camp, who assisted Chairman J. M. Pruner. Scores were carefully checked by the committee and the awards made by C. J. Dilke.

The trophies, consisting of two silver clocks with golf statuettes mounted, were won by R. C. Smith of the American-Hawaiian flight and W. Siebert of the visitor's flight.

A. B. Camp, runner-up in the American-Hawaiian flight won a nice cup, while H. Fuller of the guest flight won a similar cup.

J. R. Fitzgerald, district manager, San Francisco, and his able assistant, Bill Dooling, were unable to play with the boys, but showed an interest in checking up throughout the tournament, and were on hand particularly at the 9th and 19th holes wishing the boys the best.

Ed. Mero started out in grand shape, but accumulated so many strokes that he could not keep track of them, therefore, had to quit at the end of the first nine. Mero's clubs just would not work.

Individual scores follow:

W. Siebert	72
R. Smith	75
H. Fuller	75
A. B. Camp	78
A. C. Keene	78
C. J. Dilke	79
E. E. Lee	79
C. L. Conlon	80
F. C. Brotherton	81
T. Forster	82
B. Wilkie	82
E. Essner	84
V. S. Showell	85
L. M. Ducommun	85
R. Brown	85
J. B. Rogers	86
W. L. Franz	86
L. Sha'n	86
M. F. Heaney	87
C. Foster	87
F. Kobely	88
C. D. Allen	88
A. N. Mattes	88
I. Reed	89
C. Van Covering	91
A. Johnson	91
J. H. Farmer	92
F. C. Hardy	92
M. J. Ratozzi	93
S. Saunders	94
F. P. Ritchie	94
A. Mason	95
A. Brown	95
J. M. Pruner	95
L. Levin	96
L. W. Manuel	96
M. Marchetti	96
H. Middleton	96
Mrs. A. C. Keene	97
E. Wraa	100
E. Mooney	100
J. B. Powers	101
D. Todman	102
E. Rasmussen	107

F. Orr	107
H. Bedford	108
C. W. Richardson	113
E. Mero	in trouble
T. A. Taylor	" "

The American-Hawaiian boys hold a tournament in April and October of each year and these events grow in popularity.

The staff is now looking forward to the one coming in October.

Obituary

The many friends of Captain Ed elbert L. Smith, master of the motorship Californian of the American-Hawaiian fleet, learned of his death with profound sorrow. Captain Smith died at Portland, Oregon, April 11, from natural causes in his sleep.

Captain Smith was born in Nova Scotia in 1876 and started his seafaring at the age of 16 with the Nova Scotia fishing fleet. He had an unblemished record of thirty-six years in the American merchant marine, twenty-five of them with the American-Hawaiian Steamship Company. Both his father and grandfather were oldtime ship masters, his father for several years having rigged all the sailing vessels built by Donald McKay.

In October, 1931, on the retirement of Captain William Lyons, Captain Smith was transferred from the Minnesotan to the motorship Californian, flagship of the American-Hawaiian fleet, and was in command at the time of his death.

James Flood, who for many years was prominent in trading and shipping circles in San Francisco, died last month at the age of 67. He was a native of San Francisco and, together with his twin brother, George, built up the trading and shipping business which bears their names.

Max Holzapfel, a member of the firm of Holzapfel's, Limited, died in London, March 26. He was born in Germany in 1861, and in 1877 went to Newcastle-on-Tyne, England, to join his elder brother Albert who was established in that city as an agent for ships bottom compositions. Later, with the help of A. C. Holzapfel and with his brothers Leopold and William, he started the first of M. Holzapfel & Co., manufacturers of International Compositions.

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Promoting Accident Prevention

ON the sound and praiseworthy theory that every industrial concern is entitled to the benefits of organized accident prevention, the National Safety Council has just announced a practical plan for spreading the gospel of Industrial Safety throughout the length and breadth of the land. Every company, large or small, regardless of whether it holds membership in the Council, can have that organization's help in establishing a definite working plan for a continuous campaign of accident prevention.

The safety work of several thousand industrial members in all industries has recently been analyzed and their most effective technique will be made available to any plant desiring a specific course of safety procedure without cost. The sole obligation on the part of the employer will be to provide a few essential facts from which Council engineers can draw up a practical working plan commensurate with the needs of the company and applied to the specific operating problems.

Also as a result of this survey a new service is offered by the Council to old and prospective new members. It is known as the "Complete Industrial" service and is exactly what its name implies—adequate, sufficient, all-inclusive. It represents a high standard in safety technique and reaches not only management, key safety men and foremen, but also every employee.

Born of experience, it is authoritative which means it is not so much a question of trying it as of using it. It reflects another decidedly progressive step in the work of the Council for it is a definite, tested method of reducing accidents.

A description of the new service may be pretty well summarized in one word, "personalized." In the past, warfare on accidents has been directed mainly by foremen and safety engineers. The new plan takes cognizance of the fact that it is really everybody's business.

For example, inter-department or inter-group safety contests have played an important part among companies conducting the most successful safety programs. Through this new service the Council provides its new Industrial Safety Trophy, an attractive heavy bronze plaque $7\frac{1}{2} \times 11\frac{1}{2}$ inches, to be awarded the department or group winning the year-round safety contest within the company. The trophies are provided for display throughout the year and at the conclusion of the contest are inscribed and presented with proper ceremony to the winning group. In this way every employee has a definite, intimate part to play. A new trophy is provided annually.

A paramount feature of the new plan is its reaching the individual workman. That popular little magazine, The Safe Worker, is sent out monthly to every employee in the company. Pay-envelope messages also are provided to be given on pay day to every worker as an added reminder for safety. In many other ways management reaches the man on the job, who, after all, must be won over to accident prevention if the program is to be successful.

The National Safety Council will gladly furnish full information on the new complete membership, and also stands ready to help any reader of Pacific Marine Review in laying out a practical working plan for handling accident problems, without any membership obligation whatsoever.

Lighting BLACK GOLD down the Erie



The "Boston Socony," one of the Standard Oil Co. fleet of oil barges equipped with Kohler Electric Plants.

FROM Buffalo to Albany—over 340 miles of Canal—through 34 locks—a fleet of Standard Oil Barges plies busily with precious cargoes of oil. Throughout the navigable season, these boats are moving day and night—depending after dark on safe and sure lights from current generated by Kohler Electric Plants.

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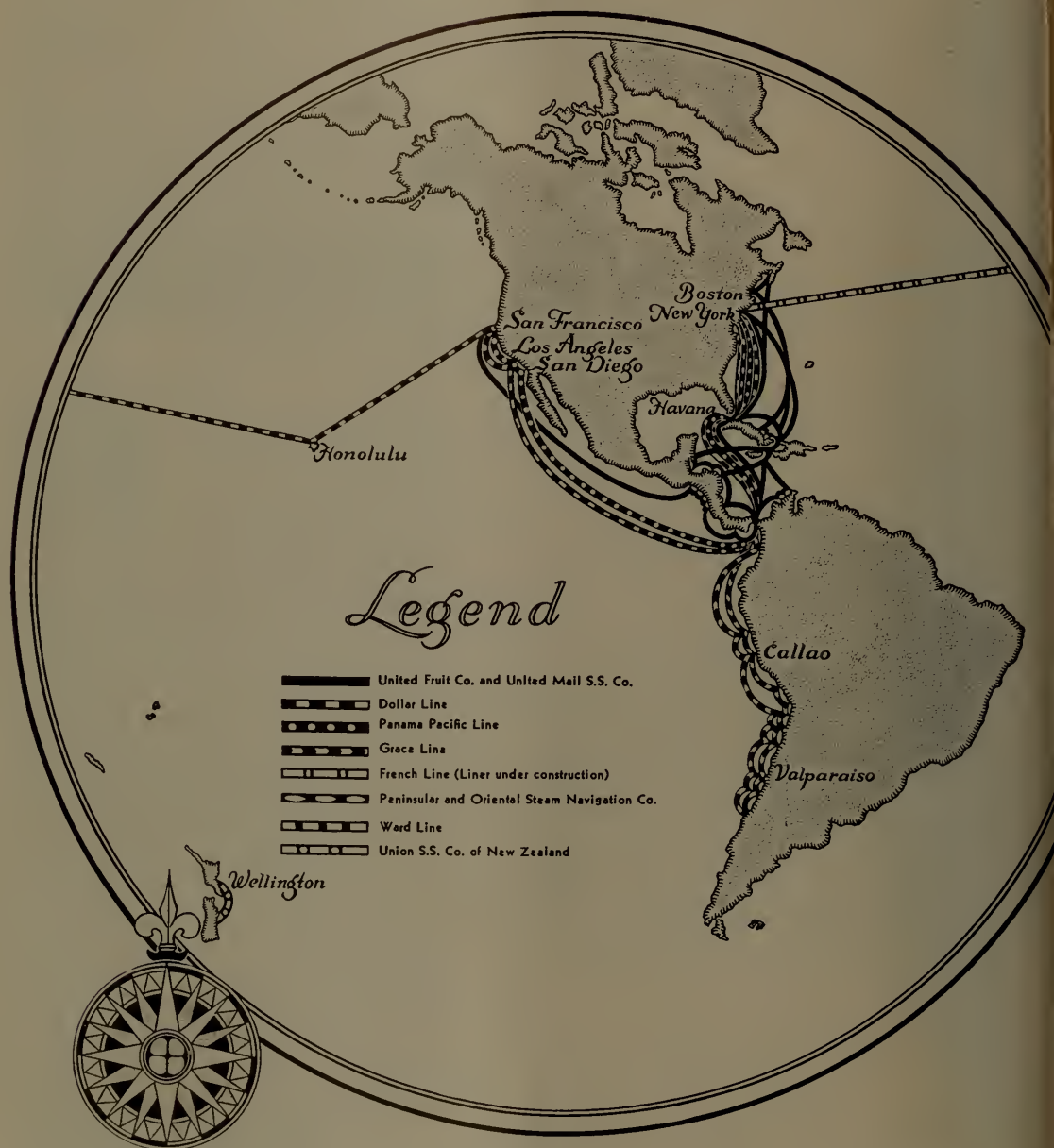
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Pacific Marine Review

JUNE, 1932



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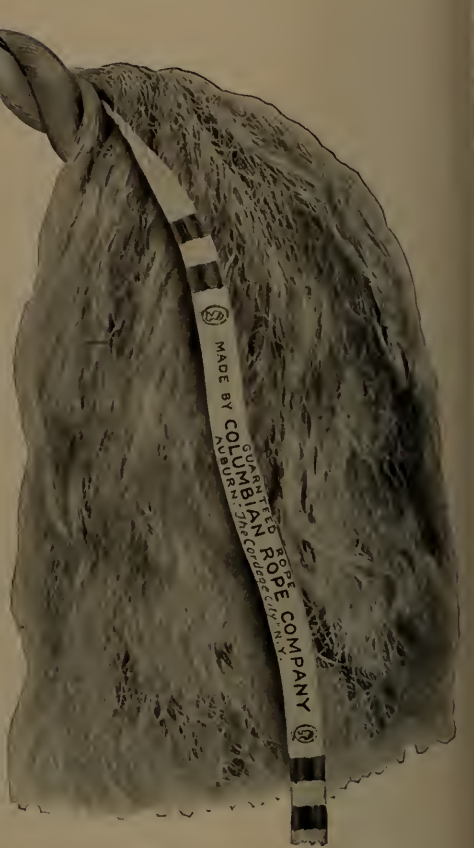


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Pacific Marine Review

The National Magazine of Shipping

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Official Organ
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Vice-President and Manager

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Shipowners' Association
of the Pacific Coast

Alexander J. Dickie,
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Editorial Comment » » »



Robert Dollar

IN 1858 there arrived at Ottawa, Canada, from Falkirk, Scotland, a 14 year old boy whose equipment for life in the new country consisted of good health, a keen, clear brain, an abiding faith in God and in his fellowmen, a copy of the English bible (King James version), and a common school arithmetic. Carrying this equipment along, the boy found a job in a lumber camp in the Canadian woods at ten dollars per month.

In his Bible, this boy found a promise and a proverb which he determined would be his keys to success. The promise: "This book of the law—thou shalt meditate therein day and night, that thou mayest observe to do according to all that is written therein, for then shalt thou make thy way prosperous and then thou shalt have good success." The Proverb: "Seest thou a man who is diligent in his business, he shall stand before kings."

As boy and man, Robert Dollar meditated much in the "Book of the Law." As a man he achieved much prosperity and much good success. Equally as chore boy in a lumber camp or as one of the world's great shipping executives, Robert Dollar was diligent in business and as a man he came to stand before kings.

Thrift, righteousness, friendliness were the qualifications upon which he built up the great shipping and lumber interests that have made his name famous in all the world ports. His shrewd leadership was given without stint to the upbuilding of the American merchant marine, as well as to the business of his own fleets.

Robert Dollar was not only a great leader in the business world, he was also a great world philanthropist. His business leadership may soon be forgotten, as the busy world is apt to forget, but his kindness to children will long be remembered on at least three continents. The children of the Presbyterian orphanage at San Anselmo, California, the Ming Quong home for Chinese girls in Oakland, California; of the playgrounds and parks in his native city of Falkirk, Scotland; and of several homes and schools in China will always remember the kindly American gentleman who so generously built for their comfort and pleasure. The young men of many American and Chinese "Christian Associations" will long remember his beneficence.

Two professorships he endowed at the Presbyterian Theological Seminary at San Anselmo, California, and other special gifts to educational institutions will also keep his memory alive. Many friends and business associates have been helped over hard spots in their lives by the wise counsel or timely assistance of this Dean of American Shipping.

Eighty-eight years of such full and useful life were given to Robert Dollar ere he passed peacefully away at his home in San Rafael during the early morning hours of Monday, May 16.

For forty years Robert Dollar has been in the shipping business on the Pacific Coast, and for over twenty years he has been the most virile leader in that business. As a leader he was optimistic, always prophesying a great and glorious future for Pacific Ocean Trade. Even during the present great world depression he has consistently upheld his faith in that vision. This simple, unshakeable faith, combined with his energy and diligence, enabled him to be the leader that he was and to achieve the success that was his.

It is for us who remain not merely to mourn his passing but to dedicate ourselves to the emulation of that faith and to work with equal energy and diligence for the fulfillment of that vision. We feel confident that had Robert Dollar been asked to choose an obituary notice that would have fully expressed his ideas for the future conduct of American Shipping on the Pacific Coast, he would have selected that great word from his old Bible—the word spoken by Jehovah to Israel when their great leader had passed on, "Moses, my servant, is dead. NOW THEREFORE ARISE!"

Lord Incheape Passes

JAMES Lyle Mackay, first Earl of Incheape and the leading figure in British shipping, died suddenly of a heart attack on his yacht *Rover* off Monte Carlo, May 23.

Born in Arbroath, Scotland, in 1852, within fifty miles of the birthplace of his friend Robert Dollar, James Mackay started earning his living as an office boy at two shillings a week. At the age of 22 he went out from London to Bombay, India, as a clerk, with no influence and no funds. In less than twenty years he had become one of the leading British business and shipping men of India.

Lord Incheape built up the Peninsular and Oriental Steam Navigation Company until it owned or controlled shipping companies whose combined fleets aggregate 379 steamers and motorships, with a total gross tonnage of over two and a half millions—the largest commercial fleet in the world under one management. Included in the combination, and of special interest to the Pacific Coasts of the United States and Canada, is the Union Steamship Company of New Zealand.

The great characteristic of James Mackay was integrity. Perhaps the most striking example of this was the deal he carried through with the British Government in the world-wide sale of the British war-built fleet of merchant ships. These ships were turned over to him at his suggestion, he acting as a broker for the government without commission but charging the government with the actual expense of the sales. The result was that these ships were sold on the open world market at a time when ships were scarce. The British Government actually made a net profit on its war-time construction of merchant shipping.

James Mackay—Robert Dollar—two poor Scotch boys, no schooling, no "pull," no capital. Born within fifty miles and within ten years of each other, each of these boys carved out, on opposite hemispheres and under different flags, name and fame, riches and influence far beyond that of the great majority of princes and kings.

The United States of America and the British Empire have suffered great loss in merchant marine leadership by the passing of these two great men.

Oceanic Steamship Company

THE Oceanic Steamship Company of San Francisco is to operate the new liners *Mariposa* and *Monterey* in the San Francisco-Sydney service. This announcement from the head office of the Matson Navigation Company at San Francisco will be welcomed by all the old timers on the Pacific Coast, as well as those in the Antipodes. It retains an identity which had become a household word in the Pacific Ocean islands "down under," and it is not only a graceful gesture but a good stroke of business psychology.

For forty-five years before its merger into the Matson Navigation Company, the Oceanic Steamship Company had maintained a service on this long transpacific route. This firm has always named its vessels after the counties of California. Thus one of its first two ves-

sels was the Steamship *Mariposa* and the other Steamship *Alameda*. On November 21, 1885, the Steamship *Alameda* began the service, sailing from San Francisco for Sydney, via Honolulu.

The Oceanic Steamship Company was owned principally by the late John D. Spreckles and was managed by that fine old seaman, Captain Frederick S. Samuels.

At first this service was partly American, partly British; Oceanic Steamship Company furnished two ships, Union Steamship Company of New Zealand furnished one. After a year or two this arrangement was found to be unsatisfactory, and by mutual agreement the entire service was taken over by Oceanic Steamship Company, who chartered another steamer to run along with the *Alameda* and *Mariposa*.

In the Nineties, the Oceanic Line began planning for new and larger steamers to take care of its increasing trade; and in 1900 the company contracted with Cramp's shipyard, Philadelphia, to build three fine steamers. These ships, the *Sierra*, *Sonoma*, and *Ventura*, were put on the run and have served this route faithfully up to the present time. Much goodwill and prestige have been built up through these forty-five years of faithful service, and we are glad that the name and the fame of the Oceanic Steamship Company is to be maintained on the Pacific Ocean Trade Routes.

Naming the "Great White Fleet"

IN answer to numerous inquiries concerning the derivation of the names of the five new additions to the "Great White Fleet," the United Fruit Company announces that it has followed its usual policy in naming most of its new liners after some city, mountain range, or province of note in one of the Central American or South American Republics served by the company's fleet.

The names of the five new vessels and the derivations of the names follow:

"*Antigua*"—named for the ancient capital of Guatemala which for more than 200 years was one of the largest capitals in the New World. As long ago as 1686 it had a population in excess of 60,000.

"*Chiriqui*"—named for a province in the Republic of Panama, famous for its wonderfully diversified and fertile uplands. Vast treasures of mineral wealth and timber abound in this province.

"*Talamanca*"—named for a district between Costa Rica and Panama, famous for its decorative pottery.

"*Quirigua*"—an ancient stronghold of the Maya Indians of the Fourth Century. Ornate monuments and temples still stand in this forsaken city now surrounded by the jungle.

"*Veragua*"—named after the mountain range traversing the Republic of Panama. Fortunes in gold have been taken from the region through which this range passes.

Particular interest is centered on the new vessels of the "Great White Fleet," not only because they represent the last word in luxury for tropical cruising, but also because they enable the United Fruit Company to establish a fast intercoastal service between New York and California ports, with connections at the Panama Canal.

Pacific Trade Prospects

By James A. Farrell*

SOME of our friends in Honolulu are accustomed to speak of the landed area surrounding this great ocean as the "Pacific Basin." It is a term suggestive of the developments that have been in progress for the last three or four decades and that seem now to be approaching the stage where the appropriateness of that designation of this area will receive world wide recognition.

This great ocean washes the shores of four of the six continents and furnishes their great trade routes to something like half the population of the world. Hawaii is its strategic and commercial center, the cross-roads of those trade routes.

Westward lies the Orient with its teeming millions of hard working, thrifty people, the great majority of whom are enduring a standard of life materially below that of some of their neighbors. One of the great purposes of this meeting was to study ways and means by which that standard might be elevated in some degree.

South and southwest lie Australia and the myriad islands of Polynesia and Oceania, with all their varied forms of nordic and tropic civilization.

Eastward the three Americas, North, Central, and South, stretch across thousands of miles of latitude and embrace markets that respond to every form of human need.

This, in brief, is the outline of the Pacific Basin. Across this basin there flow today vast currents of international trade.

This convention is here to consider methods and means for expanding and improving the exchange of our various products among our own peoples. That is the immediate and sufficient purpose. But back of that and underlying it is the basic motive of bettering conditions of life for the men and women who dwell in this great area. We stand for better living conditions for all peoples, everywhere. That is our fundamental impulse. Much has been done in recent years to achieve fulfillment of that motive. In 1913 the international commerce of the countries of the Pacific Basin aggregated six billion dollars and constituted 14 per cent. of the total of world trade. By 1929, when the total of world commerce had grown from 41 to 67 billion dollars, the share of it held by the countries of the Pacific Basin had expanded from 6 to 14 billions.

Abnormal economic conditions of the last two years have caused a serious decrease in general world trade, but it is significant that trade across the Pacific shows a greater resistance to depressing influences than that of other parts of the world. This is particularly true of United States trade in this area.

Thus the volume of our exports to all markets was only 20 per cent. less in 1931 than in 1930, and the volume to Asiatic markets was only 5 per cent. less than in the preceding year. To India, China, and Japan our exports in 1931 actually increased in volume by 6 per cent. over those of 1930. This tendency is even more clearly shown by the trade figures for the last six months of 1931 compared with the last six months of

the previous year. Our exports to China increased between the two six-months periods from 52 million dollars to 69 million dollars, while those to Japan increased from 68 million dollars to 77 million dollars. This was in a period when the average recession in our exports to the world in general was about 35 per cent. The principal factors contributing to this gain were raw products. Last year, for instance, the Far East bought more than a billion pounds of our cotton, or 35 per cent. of our entire crop. This is more than twice the cotton purchased from us by the Far East during the preceding year and is the largest share of our crop that ever crossed the Pacific.

Our imports from the Far East show a rather more severe recession than our exports. Our imports of silk, for instance, although fairly constant in quantity decreased more than 25 per cent. in value from Japan and more than 30 per cent. from China, and our imports of hemp from the Philippines decreased from \$8,500,000 in 1930 to \$2,900,000 in 1931, or more than 60 per cent. Similar reductions are noted in our imports of rubber, jute, tin, wood oil, and wool.

China, although suffering from civil turmoil, still shows important signs of development as the standard of living irresistibly rises in those parts of the country which enjoy peace. During the past two years the increase of road-building in South China has led to largely increased purchases of gasoline and to a growing importation of motor buses. There has been a steady growth in the use of American electrical machinery for house, office, and manufacturing equipment. Extension of telephone and telegraph lines continues, and increase in construction, particularly in South China, has led to a fairly constant demand for American cement and lumber. Last year China took 20 per cent. more of our Douglas fir exports than in 1930. She is now the largest overseas user and buys 40 per cent. of the Douglas fir we sell abroad.

Australia has reversed her negative trade balance during the past year and has built up a very substantial positive balance. For the twelve months ending November 1 of last year her imports were only \$47,000,000 compared with \$107,000,000 for the corresponding months of the preceding year. In this same period exports dropped only \$4,000,000. from 93 to 89 millions, and now enjoy the unusual position in Australia of being twice the current amount of imports. Slight gains have been made in recent months in exports in meat, butter, wheat, and wine; but wool and ores and concentrates and most other Australian exports remain stationary or continue to decline.

Our exports to India during 1931 occupied for the first time a place second only to that of the United Kingdom, amounting to \$52,000,000.

Trade in the Pacific basin has more than doubled in the fifteen years between 1913 and 1929. It is significant that that growth of trade was not accomplished or caused by a corresponding increase of population. But it did accompany a striking development of the means of transportation and communication. Steamships have multiplied and the radio has been added to the cable. The facilities of commerce have increased in number and efficiency, with growth of commerce their constant companion. This progress still goes on and will continue. It is a process that is never completed. The disturbance of balance between production and consumption from which the world is now suffering will be corrected and the forward march will be resumed at a probably accelerated pace.

*Extracts from an address at the Nineteenth Foreign Trade Convention, Honolulu, May 6, 1932.

First Class
Dining Saloon
on
Oceanic Liner
Monterey



This splendid room seats 374 passengers at small tables. Captain Matson's first vessel, the *Emma Claudina*, as described on the opposite page, could easily be stowed away complete in this dining saloon.

The Saga of Pacific Sea Lanes

Short Story of the Maritime Career of Captain William Matson and of the Development of the Matson Fleets

GREAT ships, like great men, may often be traced to antecedents both humble and obscure. So it is with the proud new Matson Liners Mariposa, Monterey, and Lurline, \$8,000,000 units in the expansion program of the Matson Navigation Company.

The nucleus from which grew the present gigantic Matson fleet was a tiny sailing schooner, Emma Claudina, of barely 200 tons burden. One fine day in 1882 this brave little craft sailed through the Golden Gate from San Francisco and set her course for Hilo, Hawaii. The log of that long and uncertain voyage is cherished today as the first chapter of Matson Line history. Keeper of the log and Master of the Emma Claudina was a sturdy young Viking immigrant, the late Captain William Matson.

Captain Matson was born in Lysekil, Sweden, in 1849, and went to sea at the early age of ten. He was only 18 when he arrived in San Francisco, having come around the Horn. At the age of 21 he had won his master's papers and took command of a schooner plying between San Francisco and the Puget Sound.

William Matson had ambition. He knew what he wanted. He foresaw the trade potentialities of Hawaii and he set about with courage and determination to acquire the means with which to carry on his venture. His enthusiasm and sincerity won him the support of the Spreckels brothers who loaned him enough money to buy an interest in the Emma Claudina, of which he was made the master. That was in 1882.

Success attended his efforts. To the Islands he carried general merchandise and from the Islands he brought raw sugar, pineapples, coffee, and hides. The Emma Claudina was soon inadequate for the trade and



The brig Lurline, first vessel built to the order of Captain William Matson.

other sailing ships came under his control—the Lurline, Harvester, Falls of Clyde, Roderick Dhu, and others equally picturesque in name and memory.

In 1901 Captain Matson and his associates organized the Matson Navigation Company. The next year he changed from sail to steam, purchased his first steamer, the Enterprise, and converted her to an oil burner. Incidentally, the Enterprise was among the first ships on the Pacific to burn oil fuel and to use radio communication. The Captain was then getting a start in his development of California oil fields, during which he organized the Honolulu Oil Corporation, Ltd., and became one of the leading figures in the state's oil industry.

The San Francisco earthquake and fire in 1906 dismayed the Viking skipper not at all. He kept on as usual, although most of his books and accounts were burned in the conflagration. In that year he bought another steamer, the Hilonian. In 1908 he placed a contract for the steamer Lurline, first steamship built to his order and under his specifications. She was named after the brig Lurline, first sailing ship built to his order. The new \$8,000,000 Lurline, now building at Quincy, Massachusetts, will be the third ship of that name in the Matson fleet.

Passenger business developed just as rapidly as freight, and when Captain Matson built the Wilhelmina, with her twelve bathrooms and accommodations for 140 passengers, many shipping men shook their



Captain Matson's first steamer was the Enterprise, which he purchased in 1902 and converted to an oil burner—one of the first on the Pacific. This vessel was also one of the first Pacific Ocean ships to use radio communication.

The first steamer built to Captain Matson's order was the fine cargo and passenger vessel Lurline. The new palatial liner Lurline, now building at the Fore River Plant of Bethlehem Shipbuilding Corporation, will be the third of that name in the Matson Fleet.



heads and called it a rash venture. They predicted he would soon go into bankruptcy.

But William Matson knew what he was doing. Soon came the Manoa, Matsonia, and Maui, the later two liners carrying 10,000 tons of cargo each as well as 200 passengers. During the war, three of these ships, the Maui, Matsonia, and Wilhelmina, were used to transport men and supplies to the American Expeditionary Forces in Europe.

Worn out by his many activities, William Matson's great soul went out on the ebb tide in October, 1917, but his life monument, the Matson Line, continued to grow and prosper.

Early in his career Captain Matson had become associated with E. D. Tenney, a prominent business man of Hawaii, who is now chairman of the board of directors of the Matson Navigation Company. For the past fifty years Mr. Tenney has been closely identified with the development of the Hawaiian Islands. He is a former president of the Matson Line, of the Hawaiian Sugar Planters' Association, and of Castle & Cooke, Ltd., agents for the Matson Company in Honolulu. He located in Hawaii as a youth, and by his outstanding business acumen, foresight, and integrity became recognized as one of the keenest business minds in the Pacific area. He worked with Captain Matson in introducing the use of fuel oil to Hawaiian sugar plantations to take the place of coal, and he saw eye to eye with the Captain when it came to improving Matson Line service and building new and better vessels.

W. P. Roth, president of the Matson Line, who succeeded Mr. Tenney in that position, also enjoyed long association with Captain Matson both in the steamship

company and in the oil industry. Mr. Roth is an executive of outstanding ability and foresight. Since the death of Captain Matson he has worked unremittingly and most successfully toward building up the Matson Navigation Company and continuing the progressive policies and ideals of its founder.

A. C. Diericx, senior vice-president of the Matson Line, was a naval architect of note before becoming associated with Captain Matson in his shipping and oil interests. He is now president of the Honolulu Oil Corporation, which grew from the early-day oil companies founded by Captain Matson in California. Mr. Diericx designed both the Matsonia and the Maui, incorporating into both ships many features, particularly their great reserve fuel oil capacity, which made them invaluable to Uncle Sam during the World War when they were used in transport service. Mr. Diericx' latest triumphs are the Mariposa, Monterey, and Lurline the design and construction of which he supervised.

Continuing the development of the Matson organization after the death of the founder, the company in 1920 built two giant freighters, the Manulani and Manukai, of 14,000 tons each. More freighters were purchased.

In 1923 the Matson Building, a slightly sea-scaled 16-story structure on lower Market Street, San Francisco, was erected. It is headquarters for most of the Hawaiian interests in San Francisco.

Branching out further into the Pacific, the Company in 1926 purchased the Oceanic Line, owned by the Spreckels interests, which had "staked" Captain Matson at the beginning of his career back in 1882. This branch of the organization is to be operated under the



Steamship Wilhelmina, shown here in her war paint, was Captain Matson's first bid for de luxe passenger patronage. She had twelve bathrooms and accommodations for 140 passengers. She served during the war conveying freighters across the Atlantic.

name of the Oceanic Steamship Company, thereby preserving a prestige that has been built up throughout Australia and the South Seas for the past forty years. The steamers taken over were the Sierra, Sonoma, and Ventura. They serve Hawaii, American Samoa, Fiji, Australia, and New Zealand. This route is now being taken over by the new liners Mariposa and Monterey.

Maintaining the traditional role of pioneers, the Matson Line in 1927 built and placed in operation between San Francisco and Honolulu the famous Malolo, which was the first of the American luxury-type liners built for the Pacific trade. The Company was again thought to be rash, even as when Captain Matson announced plans for the old *Wilhelmina* with her 12 bathrooms. But the *Malolo* began to operate with capacity lists and many would-be passengers had to be turned away. The *Malolo*, 582 feet long and the last word in luxurious appointment, became known as the "Speed Queen of the Pacific," making the crossing from San Francisco to Honolulu in four days.

The success of the *Malolo* was the primary factor in deciding the Matson Line management to order the construction of the three new superliners, *Mariposa*, *Monterey*, and *Lurline*, each at a cost of \$8,000,000. Officials of the Company are convinced that, despite temporary setbacks occasioned by business recessions, the Era of the Pacific is at hand and that travel volume will grow in direct ratio to the class and number of ships available.

The *Malolo* demonstrated that Hawaii's appeal for tourists had to be translated in terms of transportation. It had to be de luxe, convenient and speedy. The same is known to be true of the South Seas, New Zealand, and Australia.

In February, 1928, the Matson Line joined with the American-Hawaiian Steamship Company in the formation of the Oceanic & Oriental Navigation Company, a line of 20 modern freight steamers. The Matson Line's half of the fleet—ten ships known as the "Golden Boats"—serve the South Seas, New Zealand and Australia, and the American-Hawaiian's half serve the Orient and Philippines.

Continuing the policy of expansion, the Matson Line in October, 1930, purchased the Los Angeles Steamship



The Matson-Lassco liner *City of Los Angeles* in the locks of the Panama Canal on the occasion of a recent trip around South America..

Company, known as the "Lassco Line" which operates passenger and freight liners coastwise and between Los Angeles Harbor and Hawaii. In addition to merging the fleets of the two companies and coordinating schedules, this move gave the Matson organization the advantage of access to the port of Los Angeles, one of the greatest tourist centers of the United States.

Upon completion of the *Lurline*, the combined Matson fleet, including ships of subsidiary lines, will total forty modern steamers, with a capacity of approximately 200,000 gross tons. Certainly a proud progeny of the little 200-ton parent ship, *Emma Claudina*, of a half century ago! And a high tribute to the courage and vision of her rugged skipper, Captain William Matson.



The cargo and passenger liner *Maui* of the Matson Navigation Company's Honolulu service.

Trial Data of Oceanic Line Steamship Monterey



A clear day and a glassy sea enabled the photographer to catch this remarkable picture showing a quartering view of the Monterey at full speed.

AT the same famous shipyard from which the transpacific liner Mariposa took her initial departure early in January, delivery has just been made of a second big, white express liner, carrying another familiar Californian name—that of Monterey. This ship is the second of a trio of fast ships ordered by the Oceanic Steamship Company of San Francisco and built at the Fore River Plant of the Bethlehem Shipbuilding Corporation, in Quincy, Massachusetts. The new Monterey sailed from New York May 12 for the Pacific Coast to join her sister ship in the long run from California to Australia and New Zealand via Hawaii, Samoa, and the Fiji Islands.

Since the Monterey is a sister ship of Mariposa and is substantially a duplicate of the latter, a full description of her is hardly necessary, that of the Mariposa, published in our February issue, being applicable to both ships. However, a brief summary of dimensions of the Monterey is not out of place here, and is as follows:

Length overall	631'6 ⁵ / ₈ "
Length on designed water line	628'0"
Length B.P. (to C.L. of rudder stock)	605'0"
Beam, molded	79'0"
Depth, molded, to C deck	52'9"
Draft, molded, to D.W.L.	28'0"
Displacement, to D.W.L.	26,141 tons
Gross tonnage, U.S.	18,017 tons
Net tonnage, U. S.	10,580 tons

Passenger accommodations:

First class	472
Cabin Class	229
Total	701
Crew, total	359
Normal shaft horsepower	22,000
Service speed, designed	20 ¹ / ₂ knots

The keel of the Monterey was laid on May 17, 1930; the ship was launched on October 10, 1931, and delivery was made on April 29, 1932.

The machinery of the Monterey is exactly the same as that installed in the Mariposa, the main engines consisting of twin three-cylinder geared turbines of Fore River design and build, driving twin screws. Steam is supplied at 360 pounds gauge pressure at the throttle and 650 degrees Fahrenheit temperature by 12 Babcock & Wilcox oil-burning boilers of the standard marine type.

Previous to delivery, the Monterey was taken, on April 20, 1932, to Rockland, Maine, for a progressive speed trial for standardization over the government's mile course. These speed trials were run on April 21, and the excellent performance of the Mariposa on similar trials over the same course, was duplicated to a remarkably close degree. Fifteen runs over the mile were made by the Monterey at speeds varying from 14 knots to maximum. Of the three high speed runs, the mean speed attained was 22.26 knots, at 132.3 revolutions per minute and 28,825 shaft horsepower. The fastest run was at the rate of 23.003 knots at 132.5 revolutions per minute and 28,900 shaft horsepower.

Corresponding figures for the Mariposa were: 22.27 knots average, at 132.1 revolutions per minute, and 28,130 shaft horsepower; and for the high run, 22.84 knots at 132.5 revolutions per minute and 28,450 shaft horsepower.

Following the speed trials, the Monterey made a 12-hour endurance run at a sea speed of approximately 21¹/₂ knots. During this run, the generator load was 600 kilowatts, continuous, with heating, ventilating, lighting, refrigerating, and galley equipment in use, so far as practical, as in normal service. The average shaft horsepower for the twelve hours was 23,132 at 125.5 revolutions per minute; and during the last five hours of the run, the fuel consumption for all purposes, corrected to 19,000 B.T.U. per pound, was 0.625 pound per shaft horsepower of main turbines.



Broadside view of the Monterey running 22½ knots on her trials over the navy measured mile at Rockland, Maine.

On the Mariposa, similar figures were 22,113 shaft horsepower at 124.7 revolutions per minute, with a generator load of 556 kilowatts and fuel consumption, on exactly the same basis, of 0.627 pound per shaft horsepower.

The displacement of the Monterey on trials, taken as the mean during the standardization runs on the measured mile, was 23,280 tons; this is about 50 tons heavier than the Mariposa at a corresponding time on her speed trials.

These two ships compare remarkably closely in trial performance; the splendid record of the Mariposa has been duplicated by her sister ship to a surprising degree. A careful analysis of the trial of the Monterey verifies the results of the trials of the earlier boat and points again to the excellence of design of both hull and machinery. It is noteworthy that both ships exceeded expectations of speed at the maximum developed horsepower, while the normal designed shaft horsepower gives these vessels a speed considerably in excess of the 20½ knots originally contemplated. Also, the fuel oil consumptions of both ships are remarkably close; and the economy guarantees were more than fulfilled in each case.

Tariff Barriers to Pacific Coast Exports

MOST of the drastic changes in foreign tariffs which have been prejudicial to Pacific Coast exports were made about the same time or since the enactment of our Smoot-Hawley Tariff Bill. It would not be fair to say that these tariffs are entirely retaliatory, as without doubt much of their reason for enactment lies in the necessity of the various countries for balancing their budgets, protecting their currency, and providing employment for their people.

It is well known that strong complaints are being received from our former customers about this or that levy in the Smoot-Hawley Tariff against their products. Without in any way abandoning our traditional policy of protection, it is not too much to say that in some instances, at least, the Smoot-Hawley Tariff passed be-

yond that recognized boundary of equalized standards of living into the realm of prohibition and embargo. Protective tariff is properly based upon the argument that it is necessary to sustain our standard of living, but to the extent that our present tariff law has brought about retaliation and thereby increased the barriers which the American producer must surmount to reach his market, it has reduced the return to the American producer and thereby lowered his standard of living.

Thus we have a world gone mad with "Tariffitis," attempting to cure the ills of depression and restore the standing of currency and prosperity by raising higher tariff walls. An excellent example of this lies in the lumber industry in the Pacific Northwest. This product contributes two-thirds of every payroll dollar in that region and has received slight consideration even in the Smoot-Hawley Tariff. So we find our lumbermen, together with representatives of other basic industries, in Washington, pleading for adequate protection in the revenue bill. In the lumber industry, as in many others the difference between profit and loss lies in the export business. This business is particularly dependent upon exports because different well established markets take different grades and cuttings from the tree itself, and there has thus been built up a balanced trade. Disruption of any market upsets the whole. Their export markets are gone or fast disappearing, and through lack of protection and a depreciating currency in Canada this industry is even losing a large part of its domestic market. The industry cannot survive without the protection which our lumbermen ask; but where will the vicious circle stop?

This subject of tariff barriers cannot be met in any other way than by free discussion among the business men of all the nations involved. The United States, as the chief exponent of protectionist policies, should take the lead in the summoning of this conference. The delegates from each country should be free of political bias and yet of sufficient standing and authority to have their findings ultimately translated into the necessary legislation.

Extracts from the address of Raymond B. Wilcox, president, The Wilcox Hayes Co., Portland, Oregon, delivered at the second session of the Nineteenth National Foreign Trade Convention, Honolulu, May 4

Manufactured Weather Goes to Sea

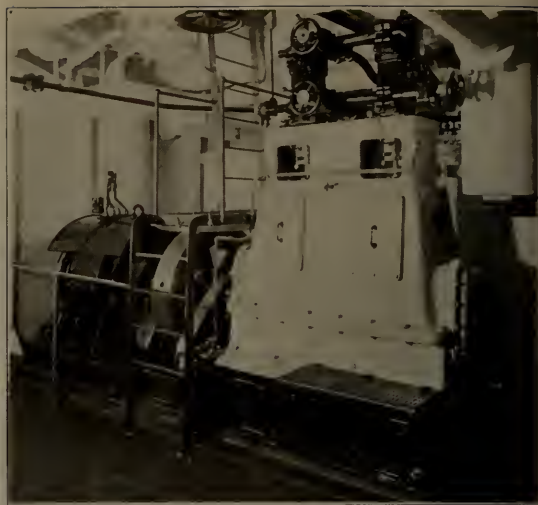
*Oceanic Liners Produce Comfortable
Conditions at Will in the
Tropics*

A NEW advance in ocean travel comfort has been introduced to the American merchant marine on the new Matson-Oceanic Liners now entering service between the Pacific Coast, the South Sea Islands, and Australia and New Zealand. These vessels, built at the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., will have their own air conditioning system to provide manufactured weather for the dining saloon. In all seasons and in all trades, at the equator or in the northern circle, atmospheric conditions in the dining saloon will be automatically maintained in the comfort zone of approximately 75-80 degrees Fahrenheit, with 50 per cent relative humidity.

This newest development in furthering the comfort of steamship passengers was first adopted on the motorship Victoria, built in England last year for the Trieste-Alexandria service of the Lloyd Triestino Line. Apparently it is to become general in American vessels. The United States Lines was the first American company to decide to employ air conditioning on its steamers. The two new cabin liners now being constructed at Camden, of which the steamship Manhattan will enter the transatlantic trade this summer, will have their own weather-making systems. Mariposa and Monterey, however, will be the first American air-conditioned vessels in service.

Sydney B. Carpender, vice-president of the Brunswick-Kroeschell Division, which installed the Carrier system on these ships under the supervision of the Carrier Engineering Corporation, expresses the view that steamship executives soon will make wide use of air conditioning. "It is a logical development in travel comfort," he says, "and should not materially increase the cost of ship construction. The method of air distribution is not greatly different from the ventilation duct work now employed on the modern liner."

The method of air distribution in the system of ventilation which had been included in the original designs of the ship, provided for the entrance of the air from the clearstory and ceiling of the dining saloon, the exhaust being effected through grilles located near the deck in the side walls. This method of air distribution lends itself extremely well to air conditioning and



One of the four Brunswick-Kroeschell carbon dioxide compressors in the refrigerating machinery installation on the liner Monterey. The motor is Westinghouse.

it was necessary, therefore, only to find a convenient location for the air conditioner and to connect this with the original ventilating system, making some minor alterations in the duct system.

One of the alterations comprises a collecting duct running behind the exhaust openings to provide for the return and recirculation of the conditioned air, thereby decreasing the amount of refrigeration required for the system.

This air conditioning system provides for all-year temperature and humidity control, and it is planned to use it for heating and humidifying in colder weather as well as for cooling and dehumidifying in hot weather. However, before the air conditioning had been decided upon, thermotanks and blowers had already been installed and can be employed for cold weather use.

It was necessary to find space for the air conditioner. This was arranged on the deck below, somewhat forward of the dining saloon, and by careful engineering layout it was found possible to carry the supply and return ducts through the boiler room with branches extending port and starboard through the engineer's stores and refrigerating rooms, then up through the deck into the crew's passage on either side of the dining saloon, where they connect with the original supply system and with the collecting duct extending along the crew's passage. The ducts thus exposed to the heat of the boiler room were made of steel plate insulated with 3 inches of corkboard, and the whole was encased in heavy canvas.

The supply of fresh air (the engineers call it "primary air") is obtained from the boat deck. A duct carries this fresh air down between the inner and outer stack casing, and here again the ducts exposed to excessive heat are well insulated to eliminate unnecessary heat gains and to insure maximum operating efficiency.

The theory of air conditioning, briefly, is that the air is passed through a spray of refrigerated water by which it is cooled. In the cooling process, the air drops part of its moisture, thus lowering its humidity. The apparatus consists essentially of a cooling chamber in

which are a series of cooling coils and atomizers, baffles, and other parts so arranged that the air is brought into intimate contact with the atomized cooled water. To achieve the necessary dehumidifying requires cooling the air considerably below comfortable temperature, so after leaving the refrigerated spray the air is warmed up to the proper temperature for comfort before entering the circulating ducts by mixing it with recirculated air from the dining saloon.

The equipment installed on the Matson liners comprises a Silentvane fan with direct connected variable speed motor, dehumidifier, spray chamber, using direct expansion CO₂ cooling coils, heater batteries, and automatic dampers. The fan draws the air, after it has been conditioned, from the dehumidifier through the heater and dampers deliver it to the duct system. The outlets of this are concealed behind grilles in the clearstory and ceiling. Special deflectors to insure horizontal diffusion are concealed behind these same grilles.

The water of the spray in the air conditioner is cooled by the ship's central refrigerating plant, which also was furnished by the Brunswick-Kroeschell Company. This central plant is comprised of four units, which is well in excess of the capacity required for ordinary refrigerating purposes. Thus it was not necessary to install additional refrigerating equipment for the exclusive use of the air conditioner. Thermostats are connected to the air dampers and special valves on the heater batteries. In this way the humidity and temperature of the air are regulated closely to a standard which is maintained regardless of weather conditions outside and regardless of the number of people in the dining room.

The dining saloon is 116 feet long by 69 feet wide and 8 feet 9 inches high, with a balcony running about half the length of the room. It will seat 475 passengers at one time. The air conditioning system has a capacity of 16,000 cubic feet of conditioned air per minute, of which from 4000 to 8000 cubic feet is primary air, the remainder coming from the recirculating ducts. A complete change of air takes place every four and a half minutes.

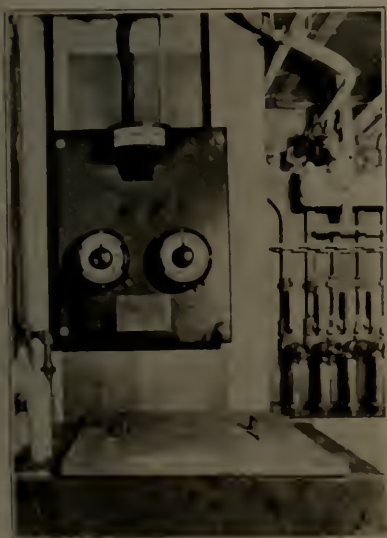


One of the refrigerating boxes for ship stores on the steamship Monterey.

In general, the air conditioning unit on these and other steamships is of the same sort as that used in theatres and in the Capitol at Washington, the main difference being in the greater compactness made necessary by restricted space on shipboard. The collecting tank also must be specially designed to prevent splashing and overflow of water as the vessel rolls or pitches.

Refrigeration Plant

Each of the four units into which the refrigerating plant for cargo and stores aboard these vessels is divided is complete in itself and the four are interconnected for flexibility in use. Each group consists of a compressor, condenser, and evaporator or brine cooler. Carbon



Refrigeration control room on the liner Monterey. From this room the temperatures of each of the refrigerated compartments on the ship can be checked and controlled. The Brown resistance thermometer shown at left may be connected to either of the nine ship stores or the six refrigerated cargo spaces.

dioxide is the refrigerant used. The refrigerating capacity of the compressors under standard rating of the American Society of Refrigerating Engineers is equivalent to the melting of 244,000 pounds of ice every twenty-four hours. The condensers are of the shell and coil type, the refrigerant being contained in the coil and sea water being circulated through the shell. There are two condenser pumps, each pump having a capacity of approximately 400 gallons per minute.

The brine coolers are similar in design to the condensers, brine being circulated through the shell and the refrigerant expanding through the coils in the coolers. The brine is circulated by three pumps having a total capacity of more than 24,000 gallons per hour, a fourth pump being kept in reserve.

The brine circulation is divided into two systems, one "high temperature" and the other "low temperature." Since much of the refrigerating duty is at relatively high temperatures, this division of the system permits operating one or more of the compressors at relatively high pressure and thereby increases capacity per horsepower input.

Because of the complete flexibility of the plant, any one group of apparatus can be used for cooling either high or low temperature brine, and the circulating system is so valved and connected that any compartment may be operated on the high or low temperature system depending on the type of cargo in that compartment on the particular trip.

The cargo holds are cooled by the so-called indirect method. The air is passed over a series of coils through which the chilled brine circulates and is evenly distributed throughout each hold by means of fans and carefully arranged ducts and openings. The arrangement of the ducts brings about complete circulation of the air



A central refrigerated cargo compartment arranged for either direct or indirect refrigeration.

and insures a positive and even cooling of the cargo. An air circulating system is the only type of system which insures a thorough chilling of the freshly loaded cargo in a minimum period of time. The ship's stores' refrigerators are cooled by exposed coils through which the low temperature brine is circulated. Substantial insulation of both cargo compartments and ship's stores' refrigerators insures minimum heat losses and an even low temperature in every compartment under the most exacting tropical conditions.

The cooled cargo space on each of the new Matson Liners consists of six separate compartments having a total capacity of 39,000 cubic feet with cooling surface so designed and arranged that temperatures from 8 to 50 degrees Fahrenheit may be maintained in each compartment separately, according to requirements. The stores' refrigerators consist of the nine compartments, containing a total of 14,500 cubic feet of storage space, arranged for temperatures varying from 8 degrees to 38 degrees. The products stored are divided into eight groups; namely, meat, poultry, eggs, butter, vegetables, fish, ice cream, and ice. There are fifteen miscellaneous service refrigerators containing a total space of approximately 1400 cubic feet maintained at an average temperature of 40 to 45 degrees Fahrenheit.

A water-cooling tank containing a cooling coil operating by means of chilled brine from the central refrigerating system provides a constant supply of ice water for the entire vessel. An ice tank with a capacity of 1500 pounds of ice every 24 hours is a part of the refrigerating system.



Wing refrigerated cargo compartment fitted for indirect refrigeration by chilled air.



Electricity on the Oceanic Liners

Some Notes on the Design, Construction, and Installation of Electric Power Plant on the Steamships Mariposa and Monterey

A MODERN express passenger and cargo liner combines in itself the functions of express transportation, hotel accommodation, and power generation. To produce an efficient, economically operating unit, these functions must be balanced. It is now quite generally acknowledged that the application of individual electric drive to the power operated auxiliaries is the most economical as well as the cleanest and most convenient method of achieving a balanced power drive aboard ship. This holds true whether the prime mover of the propulsion plant be an internal combustion engine or a steam engine and whether the speed reduction (if any) be mechanical or electrical.

Electric drive for ships' auxiliaries has been in use in the United States Navy for over thirty years and, to a limited extent, in the American merchant marine for the same period. Its use in the merchant marine fleets of the world received great impetus from the advent of the diesel engine as a marine prime mover. Experience with electrically driven auxiliaries on motorships proved to the merchant marine world that electric motor drive had the same advantages afloat as it had ashore: namely, flexibility, convenience of control, operating economy, cleanliness, and low maintenance cost.

These advantages of the electric drive for auxiliaries become increasingly evident as the modern trends in passenger accommodations and in ship equipment tend to greatly enlarge the demands for auxiliary power. A striking example of this tendency is shown in the machinery installation and the electrical requirements of the new Oceanic liner Monterey. This vessel, designed especially for maintaining, with her sister ship the Mariposa, a de luxe passenger service between San Francisco and Sydney at a sea speed of $20\frac{1}{2}$ knots, has electric drive for every auxiliary on the ship, with the exception of two main circulating pumps, six boiler feed pumps, two emergency fuel oil service pumps, two

emergency fire and bilge pumps, and two boiler test pumps which are steam driven.

The propulsion machinery of this vessel consists of twin screws, each driven by a single reduction geared, triple expansion turbine, built by the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd. These turbines have a normal aggregate capacity for 22,000 shaft horsepower and on trials reached a maximum output of 28,900 shaft horsepower, giving the hull a speed of 23.009 knots.

The total connected power load for auxiliaries and cooking is 2600 kilowatts and the total connected lighting load is 230 kilowatts, or a total of approximately 3800 horsepower in electric energy. This is 17 per cent. of the normal shaft horsepower in the propulsion plant. Experience in operation indicated that 2000 kilowatts normal generating capacity would be ample to take care of all actual demands; and it was decided that this 2000 kilowatts should take the form of four steam turbine driven generating sets.

For similar service on other ships of this fleet the Matson Navigation Company had experienced very good results with Westinghouse equipment, and the company therefore selected Westinghouse sets for the new ships of its Oceanic Line. Each of these units consists of a 500-kilowatt, 240/120-volt, direct-connected, straight shunt wound Westinghouse generator operating at 1200 revolutions per minute, and driven through single reduction mechanical gearing by a Westinghouse combination impulse and reaction type turbine operating at 6000 revolutions per minute and taking steam at 350 pounds pressure and 550 degrees Fahrenheit total temperature at the throttle valve to exhaust into the condenser at $28\frac{1}{2}$ inches vacuum. Each set is capable of carrying 25 per cent. overload.

These units are designed: To occupy a comparatively small space; to operate with very good thermal effi-

The dynamo flat on the new Oceanic liners supports four 500-kilowatt Westinghouse geared turbine generating sets. These machines easily take care of the total connected load of approximately 2900 kilowatts in power lighting and cooking.



ciency and great reliability; and to have as low weight as practical consistent with the operating characteristics.

The turbine is of the combination impulse and reaction type. The most prominent features of this turbine are the solid steel spindle, the overhung pinion, the oil governor and its application to the lubricating system, and the conically expanding steam path through the reaction blading. There are also a large number of interesting detail features such as the single helix gear, combined thrust bearing collar and oil governor impeller.

The rotor is made from one solid steel forging machined to the desired shape. That part of the rotor carrying the reaction blading is part cylindrical and part conical, to suit the steam volumes. Part of the axial thrust produced by the reaction element is balanced by the dummy piston, and the remaining part of the thrust is taken by the Kingsbury thrust bearing. The thrust bearing collar is carried on a shaft extension at the low pressure end of the turbine.

At the high pressure end of the turbine a shaft extension is provided which carries the single helix pinion and the overspeed trip mechanism. A bearing of ample dimensions has been provided to take care of the extra load resulting from the tooth pressure. The spindle glands are of the combination labyrinth and water sealed type. The labyrinth seal is formed by fins machined integral with the gland cases. That portion of the labyrinth between each runner and the interior of the turbine throttles the flow of steam along the shaft and thereby decreases the actual pressure difference against which the runner must seal. When water is supplied at the periphery of the gland runner at about five to ten pounds pressure, it is unable to flow inwards because of the pumping action in the opposite direction. There is thus maintained at the outer edge of the runner a solid annulus of water at a greater pressure than that against which the gland must seal. If necessary to keep the water temperature below the boiling point, water may be circulated through the gland.

The turbine thrust bearing is of the Kingsbury single thrust type and is of ample size for carrying part of the steam thrust. A plain babbitt thrust is provided in conjunction with the Kingsbury bearing to locate the rotor

in an axial direction. The thrust bearing collar is made very wide and has holes drilled in it resembling a simple pump impeller. The lubricating oil enters at a pressure of about 15 pounds and is discharged at about 90 pounds. Part of this high pressure oil is led to an ejector which has its suction connected to the gear case reservoir. The discharge from the ejector is led through a strainer and part of this oil goes to the bearings and gear teeth and drains back to the reservoir. The remainder of the oil is supplied to the oil impeller suction. The high pressure oil from the impeller discharge is also used for operating the throttle valve and the steam chest valves. As this oiling system does not function when starting and stopping, an auxiliary oil pump is provided. This pump is of the standard spur gear type and is directly driven by a small steam turbine. The whole unit is extremely simple and was designed for maximum reliability.

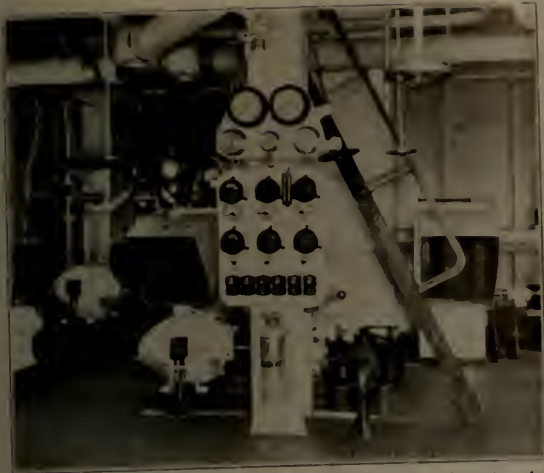
The reduction gear is of the single reduction type, the pinion and gear having a single helix with standard involute teeth. The pinion and gear are both overhung on extensions of the turbine and generator shafts respectively. As a single helix is employed it is necessary to have a thrust bearing for carrying the resulting end thrust. In principle this bearing is similar to the turbine thrust bearing, a single Kingsbury type for absorbing the thrust and a babbitted face for keeping the rotating parts in their proper axial location. A single seated throttle valve of the quick closing type is used. It is held open by high pressure oil acting on a piston and is closed by a heavy spring. Any of the following actions will automatically close the valve: overspeeding of the turbine (causing the auto stop governor to act); loss of bearing oil pressure; excessive governor oil pressure caused by overspeeding (operates if the mechanical auto stop governor fails).

An electric switch is provided which is operated automatically by the piston. This switch is so connected as to trip the circuit breaker whenever the valve is closed, thereby preventing motorizing and possible overspeeding in case of a reverse current.

The oil impeller delivers high pressure oil to the bottom of the governor piston, thus tending to move the piston upward. This force is opposed by a spring which tends to move the piston downward. As the oil pressure from the impeller varies as the square of the turbine



Installed well above the water line, this emergency generating set and large storage battery installation automatically take care of certain necessary circuits in any emergency which may temporarily or permanently cause failure in the main generating plant. The engine of this set is an Atlas-Imperial, manufactured in Oakland, California. The generator is Westinghouse. The batteries are Exide.



A view in the boiler room of the Steamship Monterey featuring the use of Westinghouse motors in driving blowers and fuel oil transfer pumps.

speed, a very definite governing action is obtained. The motion of the governor is transmitted through a system of links to the two governor valves. These valves are two-seated in order to be balanced and to present a minimum resistance to the governor. The governor travel is transmitted through a system of links to the valves. The primary valve opens first and reaches its full travel before the secondary valve starts to open. The auto-stop governor is mounted at the end of the pinion and is of the conventional type making use of an unbalanced weight operating against a spring. When the increased centrifugal force of the weight overcomes the compression of the spring, the weight moves out and strikes a trip lever which in turn causes an oil port to be uncovered, thus releasing the oil pressure under the piston and causing the throttle valve to close.

In addition to the safety devices mentioned, there is also provided an oil over-pressure trip and a low bear-

ing oil pressure trip. The over-pressure trip closes the throttle valve if, due to overspeeding, the impeller discharge pressure should exceed a predetermined point. The low oil pressure trip closes the throttle valve if the bearing oil pressure drops below a predetermined point. Both of these devices are very simple and are somewhat similar in principle to spring-operated relief valves.

There are two 3400-square foot Bethlehem two-pass straight tube condensers serving the four turbo-generators. One 10 inch horizontal single stage centrifugal circulating pump is provided for each condenser. There is a twin two-stage air ejector mounted on a combined inter- and after-condenser for each condenser. One two-stage unit is sufficiently large to remove the air from the condenser it serves at maximum power, the other being a stand-by. All air ejector inter- and after-condensers are cooled by condensate only. A recirculating connection is provided from the discharge side of the air ejector condenser to the condenser unit it serves, to provide sufficient cooling water under emergency conditions.

The turbines of the two inner generators are arranged for emergency atmospheric exhaust. The Westinghouse generator has a straight shunt winding without series coils. The commutating field winding is distributed in the main pole faces in addition to surrounding the commutating field poles. Shunt generators have the advantage of operation in parallel without the use of equalizers; also the main switching equipment is simplified. Since these are three-wire units, the number of equalizer parts would have been doubled for the split series field arrangement. Incidentally these new Matson Liners are the first in the American merchant marine to use large shunt wound generators for lighting and power service. The fabricated rolled steel construction now represents standard practice for this type of electrical machinery. Split frame and brush rigging facilitate assembly and disassembly. Double brushholders, adjacent to one another on the direct-current brush arms permit flexibility of brush contact, thereby enhancing good commutation. A pair of collector rings bring out taps from the armature winding. Brush contact with these rings from the alternating-current bal-



One of the most severe tests of the electric motor on shipboard is in its application to deck machinery. Our illustration shows the forward main deck of the Steamship Monterey featuring the four cargo winches between the two forward hatches and the windlass on the forecastle deck. The winches are by Allan Cunningham of Seattle; the windlass is by Bethlehem; the motors by Westinghouse. These winches are among the fastest electrically operated hoists ever installed on shipboard.



The Oceanic liners Monterey and Mariposa depend almost entirely on electricity for cooking. Here are shown two views in the galley, featuring the Westinghouse electric range.

ance coils complete the circuit from which the neutral connection for the 110-volt lighting supply is taken.

Switchboard and Electric Circuits

The main switchboard consists of ten panels and is about 22 feet long. The power bus is 230 volts and the lighting bus 230/115 volts with a grounded neutral. All circuit breakers providing power to auxiliaries have the time-delay feature, and breakers supplying the galleys have under-voltage trips.

There are a total of 46 electric stations throughout the ship for distribution of power and lighting. Some are for power, some are for lighting, and some are for both. Power feeders for these stations are run direct from the main switchboard. Duplicate 3-wire lighting feeders, for all but machinery compartments, are run direct from the forward and aft lighting distribution boards, one half the load connected to each feeder. The lighting for the various machinery compartments is fed direct from the main switchboard to individual panels in each compartment.

All motors are designed for 110 per cent. continuous rating in order to operate satisfactorily in the tropics. There are 235 electric motors ranging in size from $\frac{1}{4}$ horsepower to 75 horsepower, with an aggregate output of 2500 horsepower. All of these motors are Westinghouse.

Wherever possible, open-type control equipment has

been used and this has been assembled on special panels to form group control switchboards at the various electric stations. All control equipment is semi-automatic, with remote control pushbuttons at the motors. Indicator lights have been provided over the gauge boards on all vital auxiliaries in the machinery spaces to show the operation of the auxiliary.

The lighting installation for passenger quarters was worked out in conjunction with the interior decorators, Warren and Wetmore, and with Hopeman Brothers, who had charge of all interior woodwork. All of the decorative fixtures were manufactured from special designs made by the architects to suit the various decorative schemes. X-ray reflectors were used for all indirect lighting. There are 4250 lighting fixtures containing a total of 6600 lamps, varying in size from 10 watts to 1000 watts.

Of special interest is the decorative lighting scheme for the dance pavilion. All lighting is controlled from the musician's platform, and, in addition to the regular lighting, there are four spot lights with motor-driven revolving color lenses which illuminate a revolving crystal, creating a novel effect comparable with the most modern night club.

Fourteen 100-watt flood lights have been provided for illuminating the side of the ship when launching lifeboats. These lights, together with all outside lighting on the top side and such other lighting as may interfere with the navigation of the ship, are controlled from the lighting distribution panel in the wheel house. 190 12-inch bracket fans are provided for public spaces, crew's quarters, and various offices.

The supply for the various 115-volt interior communication systems is from the emergency bus; for ship's telephone system and miscellaneous interior communication system, the supply is from three 115-ampere-hour Exide storage batteries. The passenger telephone system has its own storage batteries and charging motor generator.

The emergency power and lighting plant consists of a 30-kilowatt, 115-volt, direct-current diesel engine-driven generating set with an Atlas-Imperial diesel engine and a Westinghouse generator and a 60-cell 310-ampere-hour storage battery. If the main generating plant fails, the emergency lights are automatically switched over to the storage battery, which has power available to supply the radio equipment and emergency lights for a period of about two hours, or until the emergency generator is on the line.

Measuring the Stresses in a Coiled Spring

Heavy coiled springs, like those under railroad cars, often break, although they have been built according to accepted design standards and formulas. Such failures caused A. M. Wahl, a Westinghouse research engineer, to make some unusual tests. He found the actual shearing stress in a spring was very much greater than that accepted by engineers.

He also found that stresses inside the spring are often two and one-half times as great as those on the outside, where measurements had always been taken. With these new facts it was a simple matter to design and make springs of the proper cross section and strength to eliminate breakage under the required loads.

Rubber to Steel

Discussion of Some of the Problems Presented in the Installation of Rubber Flooring on Steel Decks

By Paul Coste

Sales Manager, Flooring Division, United States Rubber Company

RUBBER flooring is highly desirable on shipboard and has come into great favor for passenger accommodation spaces, especially since the comparatively recent developments which have made this product available in a wide range of beautiful colors and patterns. In the beginning of its application on shipboard, steel decks were always prepared for the rubber flooring by applying a thick coating of magnesite, or other composition, which was trowelled smooth and formed a more or less porous base on which it was a comparatively simple problem to cement the rubber flooring using the ordinary adhesive employed in household and industrial installations ashore. This magnesite coating has frequently been a problem with the naval architect since it presents a considerable increase in weight which is, for the most part, above the center of gravity of the hull.

Several years ago a request was received to install rubber directly to steel decks on some car ferries which were being built for the railroads and which were to be used in transport service on Lake Michigan. After a series of laboratory tests, it was decided to try out a scheme which promised a successful adhesion between the rubber tiling and the steel decks. After three years an examination of these car ferries indicated that the adhesive qualities of the cement and the method that was used were highly successful and, therefore, when the Matson Navigation Company proposed to eliminate the magnesite on the three ships built by the Bethlehem Shipbuilding Corporation at Quincy it was believed that a sufficient test had been made to warrant undertaking this difficult task with every promise of success.

Everyone concerned was agreed that the elimination of the excess weight which was largely above the center of gravity of the ship would be of decided advantage by increasing cargo capacity and by eliminating expense.

In way of all spaces where rubber flooring was specified the shipyard installed the steel deck plates with flush joints and countersunk riveting, so that a flat surface was turned over to the contractor who was to install the rubber tiling.

The chief problem of the rubber company was to find a method which would enable the alcohol in the cement either to escape or to become absorbed so that the adhesive quality of the cement would function. In other words, they must insure a thorough drying of this alcohol base cement. After many experiments it was found that by cementing duck canvas to the steel deck and allowing it to dry thoroughly the rubber could be installed by the use of the alcohol base type cement directly to the duck.

Navy specifications for adhesiveness in the case of

linoleum deck coverings call for an adhesive test on a 4-inch circular sample cemented between two 4-inch circular steel disks. A minimum pull of 200 lbs. is required in the specifications for the fracture of such test specimens. It was found that in the case of rubber cemented to duck, which in turn was cemented to the steel, that an average pull of about 450 pounds was required to effect a fracture. The alcohol in the test specimens could easily escape through the edges of the 4-inch disk and it was felt that further tests should be made under actual operating conditions to find out whether or not the duck would absorb the alcohol in the cement to a sufficient extent to insure a good bond. Such tests were made with equally successful results and, therefore, the work of installation on the steamship *Mariposa* and *Monterey* was started with every assurance that the rubber tile could not come loose.

Warren & Wetmore of New York, responsible for the interior decoration on the Matson liners, availed themselves of the beautiful color effects which are now possible in rubber and their scheme of decoration on the *Mariposa* and the *Monterey* has caused much favorable comment. The rubber floors have certainly played a prominent part in getting such harmonious and pleasing effects.

The degree of success in these super-luxury liners suggests that ships of the future can dispense with any unnecessary fill, such as magnesite, on steel decks; and it is freely predicted that rubber to steel will be a popular combination for deck coverings of the future.



View in the cabin class dining saloon on the steamship *Mariposa*, featuring United States rubber tile deck covering. On the steamship *Mariposa* and her sister ship *Monterey*, this rubber tiling is cemented to a canvas duck which has been previously cemented to the steel deck.

The Principal Auxiliaries on the Steamship Monterey

Their Number, Type, and Name of Manufacturer

No.	Item	Type	Maker
2	Main circulating pumps	Vertical, single stage centrifugal turbine drive.	Pump—Warren Turbine-Sturtevant
2	Dynamo circulating pumps	Horizontal, single stage, centrifugal, motor drive.	Warren
4	Combined main condensate and turbine drain pumps	Vertical, single stage, centrifugal, motor drive.	Warren
3	Dynamo condensate pumps	Ditto	Warren
1	Main feed pump	Horizontal, 3-stage, centrifugal, turbine drive.	Pump—Warren Turbine-Sturtevant
1	Aux. feed pump	(Same as main feed pump.)	
1	Port feed pump	Horizontal, single stage, centrifugal, turbine drive.	De Laval
1	Aux. port feed pump	(Same as port feed pump.)	
2	Emergency aux. feed pumps	Vertical, steam, double-acting.	Warren
2	Fire and sanitary pumps	Horizontal, 2-stage, centrifugal, motor drive.	Warren
2	Emergency fire and bilge pumps	Vertical, steam, double-acting.	Warren
2	Hand fire pumps	Double-acting.	Rumsey
2	Bilge and ballast pumps	Horizontal, single-stage, centrifugal, motor drive.	Warren
1	Emergency submersible bilge pump	Vertical, single-stage, centrifugal, motor drive.	Warren
4	Lubricating oil pumps	Vertical, screw type, motor drive.	Quimby
1	Lubricating oil purifier pump	Horizontal, rotary, motor drive.	Northern
2	Emergency fuel oil service pumps	Vertical, steam, double-acting.	Warren
2	Fuel oil transfer pumps	Horizontal, screw type, motor drive.	Quimby
4	Fuel oil service pumps	Horizontal, screw type, motor drive.	Warren
2	Drinking water pumps	Horizontal, single-stage, centrifugal, motor drive.	Warren
2	Washing water pumps	Ditto	Warren
2	Ice water pumps	Ditto	Warren
2	Hot water pumps	Horizontal, single-stage centrifugal, motor drive.	Warren
2	Priming pumps	Hytrol	Nash
2	Boiler test pumps	Vertical, steam, double-acting	Warren
2	Sump pumps	Vertical, single-stage centrifugal, submerged, motor drive.	Gould
2	CO2 condenser circulating pumps	Horizontal, single-stage, centrifugal, motor drive.	Warren
3	Cargo brine pumps	Ditto	Warren
1	Ship's stores brine pump	Ditto	Warren
2	Hand pumps	Rotary	Rumsey
4	500-kilowatt generators	240/120 volts, geared turbine-driven	Westinghouse
1	30-kilowatt generator (emergency)	120 volts, diesel engine-driven	Generator—Westinghouse Engine—Atlas-Imperial
1	Air compressor for above	Motor drive	Supplied with 30-kilowatt generator Nash
1	Circulating water pump for 30 kilowatt generator	Horizontal, single-stage, centrifugal, self-priming	Nash
8	Forced draft blowers	Vertical, motor drive	Sturtevant
2	Smoke indicators	Vertical coil	Wager
2	Feed water heaters	Vertical	Davis
2	Lubricating oil coolers	Vertical	Bethlehem
2	Evaporators	Vertical coil	Davis
2	Distillers	Vertical coil	Davis
2	Filters	Paracoil	Davis
4	Fuel oil heaters	Vertical coil	Bethlehem-Dahl
1	Fresh water heater	Vertical—controlled by therm. valve	Alco products
1	Air separator	Vortex	Western Eng'g
2	Main air ejectors	Twin 2-stage with inter- and after-condensers	Westinghouse
2	Dynamo air ejectors	Ditto	Westinghouse

One of the interesting features on the Oceanic liners is the pipe tunnel through the fuel oil tank between the widely separated boiler rooms.



No.	Item	Type	Maker
2	Air compressors	Vertical, duplex, 2-cyl., single acting motor drive	Worthington
2	Lubricating oil purifiers	Super-centrifuge	Sharples
1	Gland leak-off exhauster condenser	Vertical Straight tube	Sturtevant
144	Soot blowers	Valve-in-head	Bethlehem
	Pump regulators		Diamond
	Pressure regulators		Swartwout
1	Revolution counter and tell-tale		Leslie
2	Torsion meters	Averaging 2-shaft	Cummings
2	Machine shop tools		Cummings
1	Steering engine	Electro-hydraulic 4-cylinder	J. T. Ryerson American Eng. Co.
1	Telemotor		McLeod & Sons
2	Liquidometers		Liquidometer Corp.
2	CO2 Indicators		Permutit Co.
2	Oil separators	"Short" alarm service tank	C. V. Lane
2	Fuel oil meters	Rotating disc	Buffalo
1	Windlass	Horizontal, spur-gear, dual motor drive, 2 wildcats, 2 gypsies	Bethlehem
4	Capstans	Self-contained, motor drive	American Eng. Co.
8	Cargo winches	Single geared, high speed, motor drive	Cunningham
2	Cargo winches	Double reduction, heavy duty, motor drive	Cunningham
1	Main switchboard		Westinghouse
	Storage batteries		Electric Storage Battery Co.
	Lighting fixtures	Decorative	Black & Boyd
	Lighting fixtures	X-ray reflectors	Curtis
	Lighting fixtures	General	Lovell-Dressell
	Lighting fixtures	China	Lenox
	Sign Lights	Polarite	Frink Co.
	Bracket fans		Westinghouse
	Portable air heaters	1000-W. "Wesix"	Western Eng. Co.
	Pitometer log	Pitometer	Kearfoot
	Taff-rail log	Electric	Walker-Trident
	Telegraphs	Electric navy type	Chas. Henschel
	Searchlights		Sperry
	Ship's telephones		Chas. Henschel
	Passengers' telephones	400-line, 1-position board	Western Elec. Co.
	Electric clocks	All public spaces	Landis & Gyr.
	Pyrometers, etc.		Brown Inst.
	Pneumercators		Pneumercator Co.

Welding in the U. S. Navy

*With Particular Reference to U.S.S. New Orleans**

By Captain J. O. Gawne, U.S.N.

THE rapid increase in the use of arc welding in the construction of naval vessels has been one of the most outstanding developments in recent ship-building practice. While, in new vessels, riveting is still used for connections of ballistic plating and main strength members, welding has replaced riveting in most of the other parts of the structure and in practically all fittings.

Before the World War fusion welding had only minor and sporadic application to naval work. Acetylene was used to some extent in welding pipe, tanks, and drums, and spot welding equipment was installed as early as 1912 at the Puget Sound Navy Yard and in 1914 at the New York Yard.

The World War gave welding its first real start on naval work.

The Washington Treaty of 1922 limiting naval armaments gave welding its next real impetus. This Treaty placed a definite limit on the number and size of capital ships and aircraft carriers, and on the size of cruisers. Naval designers of the principal countries at once set to work to secure the maximum fighting qualities on the tonnage allowed. The two best methods of saving weight to devote to fighting qualities were the extensive use of arc welding and of light alloys.

The Bureau of Construction and Repair had begun an active study of the applications of arc welding in 1917. Since there were many new vessels of all types under construction after the war, opportunity was afforded for the application of welding in minor structures and fittings on battleships, destroyers, and, to a greater extent, on the light cruisers of the Omaha class. With the signing of the Washington Treaty in 1922, this study assumed a new importance and many investigations were conducted at various navy yards, but principally at the Norfolk Navy Yard.

The Salt Lake City and Pensacola, the first two 10,000-ton cruisers built under the provisions of the Washington Treaty, were the first warships on which welding was applied to any considerable extent. It was used for some less important structural members and for a large number of fittings. The application of welding was progressively extended on the next six cruisers of the Northampton class and the two later vessels of the Portland group. This paper refers to the New Orleans class, which comprises the five latest vessels of the cruiser type.

A comparison of the working force employed on the Pensacola and, four years later, on the New Orleans gives a clear idea of the rapid strides which welding has made in naval work in that short period.

This is the 22nd month in the 36-month construction period of the New Orleans. There are four gangs of riveters at work and 28 electric welders and the force is steadily being increased. In the corresponding month on the Pensacola, there were 14 gangs of riveters and 5 electric welders.

The term "welding" as used refers to direct-current metal arc welding unless gas welding is specifically mentioned. Gas welding is employed to some extent in shop work on piping and sheet metal but at the New York Navy Yard is little used in structural shops or on the ways except for aluminum.

Extent of Welding on the New Orleans

The New Orleans is one of fifteen 10,000-ton Treaty cruisers authorized by the Act of February 13, 1929. Under the London Treaty of 1930, but ten of these vessels can be built, keels for the last three of the ten to be laid down one in 1933, one in 1934, and one in 1935. There are, therefore, seven of this authorization under construction at this time. The New Orleans is a vessel 588 feet long overall, 61 feet 9 inches beam, 21 feet 7 inches draft, 10,000 tons standard displacement, and mounts a battery of nine 8-inch guns in three triple turrets and eight 5-inch anti-aircraft guns. She carries seaplanes which are launched from catapults and picked up from the water.

The extent to which welding is used is shown by the following details.

1. Bulkheads.—All the medium steel transverse and longitudinal bulkheads are entirely welded. This includes over 90 per cent. of the bulkheads on the ship and includes not only the main transverse and longitudinal structural bulkheads but also the bulkheads supporting turret foundations.

2. Decks and Platforms.—All medium steel plating and transverse beams connected to medium steel deck plating are welded. The transverse beams are generally built up of welded plates and shapes. In numerous cases, at the boundaries of special treatment steel portions of decks, the medium steel deck plating is joined to the special treatment deck plates by welded lap or butt strapped joints. Longitudinal beams are generally rolled sections and riveted, although about 30 per cent. of these beams are welded, generally at the ends beyond the middle half-length of the ship. All local stiffening of deck plating is obtained by flat bars with edge welded to the plating.

3. Shell.—The shell butts will be welded for the first 96 feet. About 80 per cent. of the length of the stem is built up and secured to the shell by welding. In earlier designs the stem was made up of steel castings.

4. Inner Bottom.—The two upper outboard strakes of plating of the inner bottom on each side are welded at the seams and butts, with single strap butt joints. This represents approximately 20 per cent. of the joints of the inner bottom.

5. Longitudinals.—The main strength longitudinals between the shell and inner bottom are riveted for about one half of their length amidships, as the shell plating in this area is riveted and it is desired to have these members work together. Toward the ends of the vessel the longitudinals taper down in depth to members known as stringers, which are welded. In addition there are welded stringers interposed between the ex-

(Please turn to Page 231)

*Extract from a paper presented at the Annual Meeting American Welding Society, April 27 to 29, 1932, New York

Welded Barge Construction at Federal Shipbuilding and Dry Dock Company*

By Gordon G. Holbrook

General Superintendent, Federal Shipbuilding and Dry Dock Co.

ELECTRIC welding in the past ten years has made substantial progress in many fields of construction. It was introduced into shipbuilding in the previous decade, but due to the necessity for haste in the war program and the lack of available design data, adequate equipment, and trained operators some unfavorable results were obtained. For the next few years the use of welding was confined principally to corrective work. Recently, a revival of constructive welding in shipbuilding has taken place, but at a much more conservative rate. In large vessels, with the notable exception of naval work, electric welding has been used principally in the design of minor parts and fittings. In the design of small craft, however, several important methods have been employed to realize the benefits of electric welded construction.

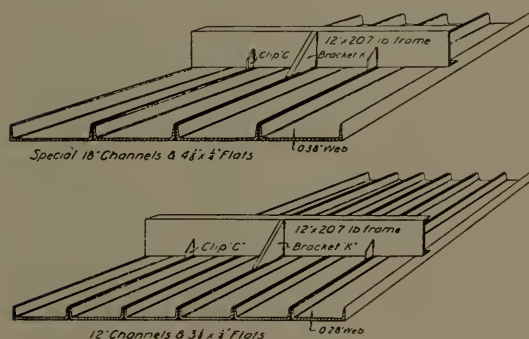


Fig. 1. Typical sections.

One of these designs is offered by the Federal Shipbuilding and Dry Dock Company of Kearny, New Jersey. This type is based on the Holbrook system of electric welded construction and is covered by patents in the United States and Canada. The basic principle of this design is the joining of rolled structural channels with intermediate flat bars, all united with a double seam of electric welding. Transverse framing members run continuously over the toes of the channels and are widely spaced. This method produces a structure of great local and longitudinal stiffness. The steel shapes generally used are the 18-inch x 38.4-lb. Carnegie channel C 60, specially rolled for the purpose, and the 12-inch x 20.7-lb. Carnegie channel C 2. The intermediate flat bars are designed to conform to the width of the flanges of the channels, and are usually $\frac{1}{4}$ inch in thickness. The frames are of 12-inch or 15-inch chan-

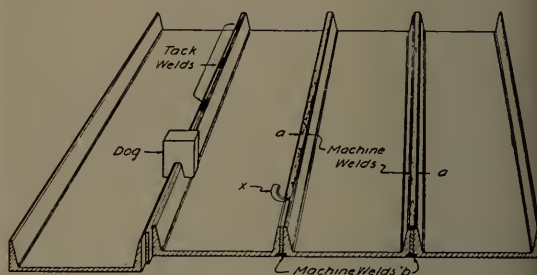


Fig. 2. A section showing method of machine welding.

nel sections spaced about six feet apart. These frames are fastened to the welded toes of the bottom channels by clips C or brackets K welded as indicated in Fig. 1.

The weld at "a" and "b" joining the channels and flat bar in Fig. 2 may be made either by hand or machine welding. On the first Federal barge these seams on the bottom and sides were welded by hand, but since that time the welding has been performed by the shielded carbon arc process. The welding head, an Electronic Tornado manufactured by the Lincoln Electric Company, is mounted on a self-propelled carriage designed and built at the Federal plant. This machine is fully automatic in its operation, and produces a uniform weld of high tensile strength and ductility. The speed of travel in service is from sixty to eighty feet per hour.

In adapting the use of the automatic welding head to our purpose, many tests were made to determine the best operating conditions of current values, arc gap, speed of travel, etc.; and these factors are maintained at the most desirable setting. Transverse test pieces through the automatic welded seams have been made and subjected to tensile and bend tests. In the case of the tensile tests, the specimens broke through the web

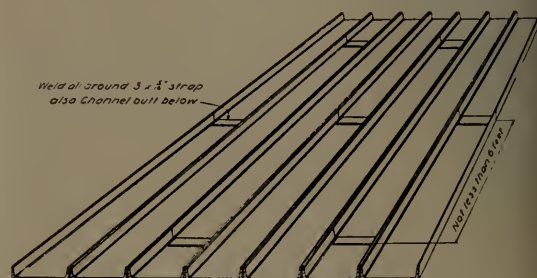


Fig. 3. A section showing arrangement of butts.

* Abstract of a paper presented at the Annual Meeting of the American Welding Society, held in New York, April 27 to 29.

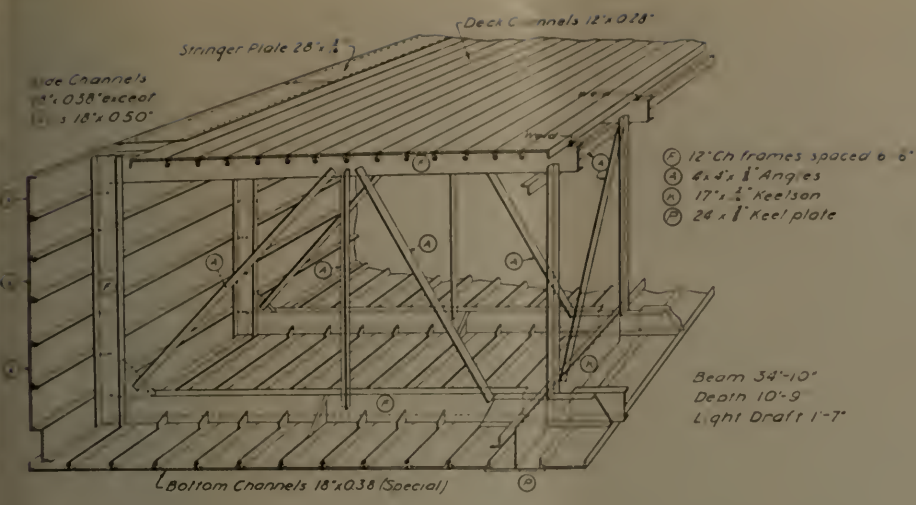


Fig. 4. A half section of barge showing ing braces.

of the channel rather than in the weld. Test strips have been cut from the weld as shown at "x" in Fig. 2. These strips bend through 180 degrees around a 1/2-inch diameter pin without evidence of failure. One advantage of the shielded carbon arc process is that slag, scale, and other impurities are floated to the surface of the weld in the puddling action.

The hand-welding employed on the Federal barges is carefully calculated and clearly shown on the detailed plans both as to size and amount. Direct-current equipment of modern design is used, and the proper current values are set by a competent supervisor. The electrodes used are bare wire. The hand operators themselves are tested by making standard test pieces in the three positions, flat, vertical, and overhead. A first-class welder must make three test pieces in each position with an average tensile strength through the weld of 45,000 pounds per square inch. Our welders generally attain from five to ten thousand pounds per square inch above the minimum requirements. No welder is employed on barge construction who has not first qualified in meeting the tests.

The general procedure in constructing the Federal barges is as follows: The channels for forming the bottom of the barge are distributed on skids, toe up. The flat bars are tack welded to one flange of each channel with care to see that the projection at the heel is correct. This projection is important, both to afford a guide for the welding machine when operating on the heel side and also to produce a reinforced weld at this point. Adjoining channels are then clamped tightly together by means of a special dog, shown in Fig. 2, and held by tack welds over the toes. The channels are between thirty and forty feet in length, and the butts are so distributed that there are at least two continuous channels between butts in the same transverse line. The butts in adjacent channels are not closer than six feet, as indicated in Fig. 3. The butts are strapped with flat bar in the inside of the channel as shown, and welded above and below. After the section is completely assembled, the automatic welding at the toes is performed by the machine operating continuously from end to end of the section. The frames and butt straps are then fitted. After the section is reversed on the skids, the

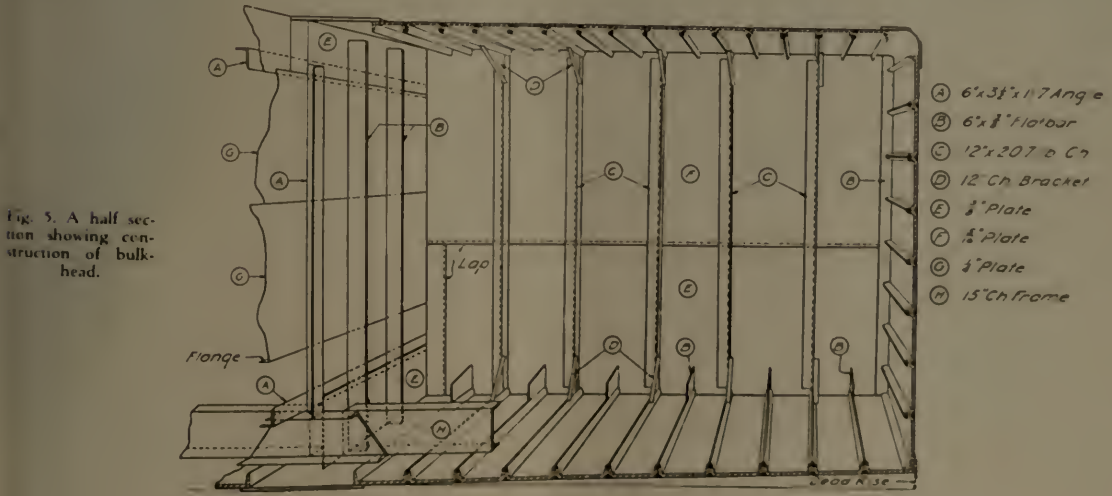


Fig. 5. A half section showing construction of bulkhead.

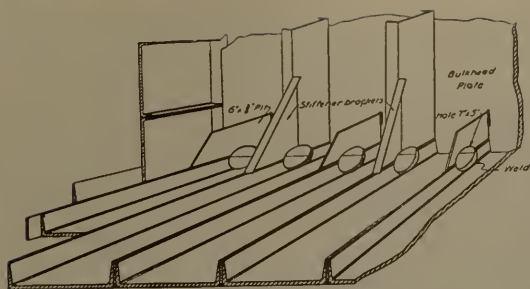


Fig. 6. Section showing drain holes.

heel seams are automatically welded, and the butts welded by hand. The section is then placed in position on the barge.

It has been our practice to assemble the bottom of the barges in sections of half the beam of the barge and the full expanded length. The sides are assembled in one piece. When the size of the barge is such that the sections so arranged are too large to handle conveniently, the assembly may be divided into two or more sections along a fore and aft line, as well as transversely, with a proper shift of butts in the latter case. The joint between sections on the barge are performed either by hand or machine welding as the construction may permit. A closing plate is often used at the center line as a flat keel shown in Fig. 4. This plate is hand welded in position with a double seam of weld at each edge. In order to provide extra stiffness to the side to resist damage or abrasion, the webs of certain of these channels are often increased in thickness. This method eliminates the need of any external fenders and still presents a smooth side on the barge. The manner in which the side fits inside the outer flange of the bottom channel is indicated in Fig. 4.

Where bulk liquid cargoes are to be carried, bulkheads are provided in the barges. The fore and aft bulkheads may be of swash type shown in Fig. 5. The transverse bulkheads are oiltight and formed of plates with angle or channel stiffeners as indicated. In order to provide efficient drainage, such barges are usually given about a 3-inch deadrise on the bottom. Limber holes are cut through the standing flanges of the bottom channels, and reinforced, as shown in Fig. 6. By this

means easy stripping of the tanks is afforded; and drainage is even more complete than in the case of a bottom constructed with lapped strakes of plating. In cases where the barge is not intended for bulk liquid cargo, it is possible to assemble the deck channels in place on the barge and so eliminate the toe welding on these channels. No loss of strength results, and a convenient method of construction is provided. The decks may be either flat or a sheer at the ends may be given. The rise at the rake ends may be made either with a single or double knuckle; or a rolled transverse plate may be employed to give a curve at this point. A general arrangement of a typical oil barge is shown in Fig. 7. Deck houses, derrick posts, expansion trunks, manholes, etc., are completely welded.

There have been nine barges built at the Federal Shipbuilding and Dry Dock Company to this design, the first one having been completed in the fall of 1928. Two of these are in the sand and gravel trade, two carry molasses in bulk, one is a derrick lighter, and four carry gasoline in bulk. Three of the latter type are 175 feet by 36 feet by 12 feet 7 inches in size and 10,000 barrels in capacity. All the barges built are reported to have given the utmost satisfaction in service. The fact that the four gasoline barges are operated by the same owner, the first going into service in the spring of 1929 and the last one being delivered in the spring of last year, is a gratifying endorsement of their advantages. The American Bureau of Shipping has approved the design and supervised the construction of the gasoline barges. These barges are also approved by the U. S. Steamboat Inspection Service. Lloyd's Register of Shipping has given general approval to the system, and in particular to the design of a 20,000-barrel gasoline barge. This design has also been approved by the American Bureau of Shipping.

The outstanding advantage of the welded barge over the barges of conventional riveted construction lies in the absence of rivets to become loosened, leak, and corrode away. The Federal design permits the extensive use of full automatic welding in the important shell and deck seams. It is worthy of note that from 67 to 80 per cent. of the entire welding on a barge may be done in this manner, assuring uniform and precise workmanship. Observations taken on the barges in service indicate that the welding metal is notably less subject to corrosion than the rolled metal in the joined members.

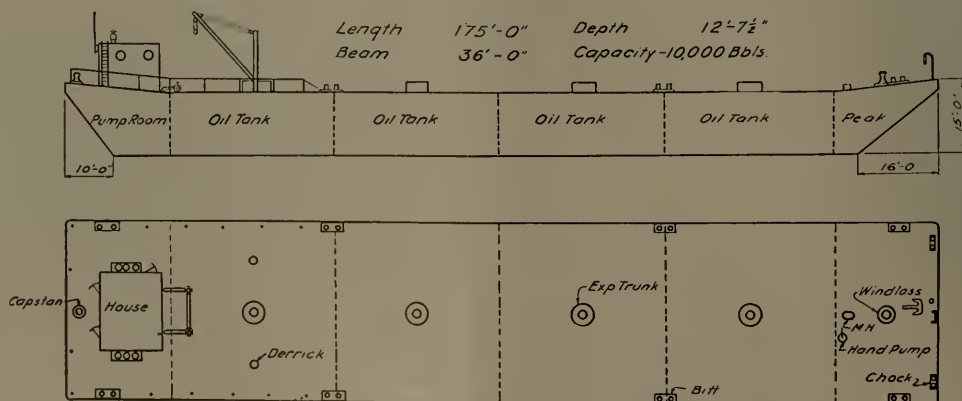


Fig. 7. General arrangement elevation and plan of all-welded tank barge.

This may be due to the floating of the slag to the surface in the puddling action of the weld, thus shielding the weld metal from attack.

The basic design of the joint between the channel members was evolved with the particular object in view of obtaining tight metal contact. The assembly dogs, mentioned before, wedge the flanges and intermediate flat bars firmly together before welding—which is a condition of utmost importance in relieving the weld of undue strains. All underwater joints are sealed with two seams of welding, separated sufficiently to avoid interfering stresses. The united flanges of the channels are very efficient in adding strength to the shell and decks, to resist local, as well as longitudinal, strains. The wide spaced frames lend themselves readily to the transverse and longitudinal diagonal bracing designed to resist racking. The smooth bottom without projecting laps or butts affords easy towing, and the flush deck is of great advantage for shoveling or carrying a deck cargo. The use of the flat bar filler is a distinct advantage over other designs employing channel construction, in that the thickness of the flat bar may be varied to suit the actual rolled depth of the channels. This eliminates any matching up of channels in the original assembly; and in the case of repair work, any channel of the same nominal size as the original may be substituted. In the case of damage, repairs can be readily effected at any place where flame cutting and electric welding facilities are available.

Much interest in this type of barge has been shown by operators engaged in carrying oil products in bulk, and the design is particularly well adapted for that purpose. This form of construction is also well suited for dump scows or carfloats, where the service is very severe and resistance to local injuries is particularly important.

Steel is now available at the lowest price in many years. Welded steel barges require no maintenance except periodic painting. Steel barges are readily constructed up to any size of advantage to operate; and with the welded barge, bulkheads may be introduced to make it actually unsinkable if desired. A favorable insurance rate can be obtained on a welded steel barge. As economy in towing becomes an important factor, the larger, more easily handled barges will become more attractive.

With regard to the cost of construction of the Federal barge for coastwise and harbor service, we believe that this type is somewhat more economical to build than the riveted barge of conventional design as built in coastwise shipyards. The tendency in developing welded designs is to stress the saving in weight permitted by the substitution of welding for riveting; thereby reducing the material costs. In the Federal design for seaboard service conditions, no attempt is made to lighten the scantlings; in fact, the amount of steel used is slightly greater than in the same barge of riveted construction. The principal economy effected in this design arises from the use of automatic machine welding with its high rate of production and uniformly superior quality. On a production basis, the Federal barge may be built at a price competitive with wooden construction. As the advantages of welding gain wider recognition and the cost of production improves, we feel certain that welded designs will increasingly supplant riveted steel or wood construction in the marine field.

Welding in the U. S. Navy

(Continued from Page 227)

tension of the longitudinals, some of them beginning 150 feet from the bow and stern to offer additional stiffness to the shell plates. The breast hooks, which are horizontal brackets at the bow, are entirely welded.

6. Transverse Framing.—In the way of the machinery spaces, the floors—deep transverse frames between inner bottom and shell plating—are riveted, excepting the oil tight and water-tight floors which have their connection to the shell welded. Beyond the machinery space, the floors and other transverse frames are riveted to special treatment steel shell plating and to the medium steel shell where the curvature of the shell plates produces too sharp a bevel with the transverse member to permit good welding conditions. In all other cases, floors and framing, especially at the ends, are made up of welded plates and are welded to the shell plating.

7. Deck Erections.—These structures are generally welded throughout with the exception of the special treatment steel portion.

8. Foundations.—Main engine and condenser foundations are generally riveted. Foundations for auxiliaries such as generators, pumps, oil heaters, auxiliary condensers, etc., are built up of welded plates and shapes. Catapult foundations, plate and stiffeners, are welded, with the exception of the top and bottom angle bar connections. Gun foundations for the anti-aircraft battery are specified to be welded, this being probably the first instance in which a gun foundation will be completely welded on any of our naval vessels and probably on any naval vessel. Extensive tests have been made at the Proving Grounds on welded gun foundations with successful results.

9. Fittings.—Fittings are generally designed for welding as it is on this type of work that the greatest percentage of saving in weight of individual members is realized. The following are instances of welded fittings: Structural stanchions, awning and life line stanchions and their sockets, bitts, stowages and shelving—except aluminum portions—piping, hatch coaming and covers, door frames and doors, vertical ladders, minor foundations and supports, ventilation cowls and large structural vent ducts, ammunition hoist tubes, davits and davit fittings. Furniture, clothes lockers, etc., manufactured by the Norfolk Navy Yard of aluminum are joined mainly by spot welding.

10. Auxiliaries.—In the purchase of hull auxiliary machinery, preference has been given in the award of contracts to those who guarantee to furnish equipment of least weight as well as lowest cost. This obviously has required the manufacturers of auxiliaries to resort to the use of welding not only in their sub-bases and framing for the machinery but also in some of their working parts. Notable examples of the application of welding to auxiliaries are the steering gear and anchor windlass. Practically all of the sub-bases and bearing supports for this machinery are made up by welding.

A very important application of welding has been made in the steam and water drums of the boilers furnished by the Babcock and Wilcox Company. Some of the sub-bases for auxiliaries, such as the generators, are to be made of built-up welded structures in lieu of heavy castings.

Wind Resistance of Ships' Hulls

By David W. Dickie

CONSIDERABLE interest has been taken recently in the loss of power due to wind resistance as ships have acquired high superstructures in combination with high speed.

The table accompanying this article has been calculated for the condition of a vessel lying at anchor in the wind. From the factors given it is a simple matter to calculate the horizontal strain on the anchor chain which in the case where there is no tide represents the actual wind resistance of the vessel.

Case 1.

Suppose the vessel to be lying at anchor in a harbor in which there is no tide. The angle of the anchor chain with the vertical can be obtained by measuring along the chain for a short distance and then measuring from this point to a vertical line.

The other useful measurements are:

1. From the water to the hawsepipe vertically.
2. From the anchorage bottom to the hawsepipe vertically.
3. From the point where the chain touches the surface of the water to the hawsepipe along the line of the chain.
4. From the point where the chain touches the bottom to the hawsepipe.

The wind direction and velocity can be measured by instruments that have been discussed at length elsewhere.

Case 2.

Where the vessel is lying at anchor in the tide a floating buoy having a deep fin can be fitted with a colored light and allowed to float past the vessel on each side far enough away so observations can be taken on the buoy by means of an alidade at each end of the vessel.

By these observations the angle of the vessel with the tide and the water velocities can be measured.

The speed and power curve of the vessel will give the resistance of the vessel due to the tide and this deducted from the total resistance in pounds given by the strain on

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Marine Equipment

PROTECTIVE COATINGS ~ EXHAUST TURBINES
TRUCKS IN MEXICO ~ RADIO INSTALLATIONS

Protective Coatings in Boilers and Turbines

By Clarence J. Hunter
Dampney Company of America

PROTECTIVE coatings for exposed surfaces are as old as the Ark; Noah coated it with pitch. Iron exists in nature only in its oxide state, and ultimately returns to it. The original maintenance engineer faced the problem of retarding such chemical action in atmosphere, and finally gave his metal, at least an economic permanence, by painting it.

This direct, well-understood, surface-defense-method of metal protection encountered a variety of problems and much opposition when first considered for the inside of boilers and steam turbines. At that time no protective coating or "paint" would remain intact under high temperature in the presence of moisture, and, having spent part of their lives and considerable money trying to keep deposited solids off the surfaces of their boilers, engineers were not immediately receptive to the suggestion that some be put there deliberately, with a brush.

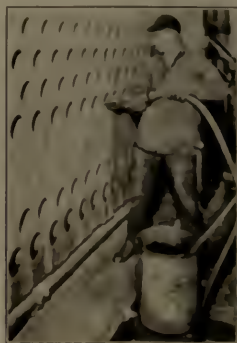
At the present time there is a wide use of protective coatings in boiler, water-wall and economizer tubes, and in boiler drums and steam turbines in all sections of the country, and over the full range of temperatures and operating conditions encountered in marine power plants. These coatings are used, not in place of proper and scientific water preparation for the production of clean steam and the elimination of indicated vital hazards to the system, but as a directly placed supplemental, defensive covering to those surfaces which are most important, and incidentally, most in need of more than one defense if conditions do not remain uniform.

Nothing applied over a thick coat of rust or water scale, or on a wet surface, should be expected to remain. Coating over mill-scale is equally uncertain in the long run. The coating selected should have an opportunity to unite with the metal and form an impervious film. Partly consumed metal, either in the form of rust or mill oxide, is no foundation on which to build.

For a long time, boiler coatings were applied almost entirely in old units or where the service period had been such as to permit effective removal of most of the original mill-scale on tubes and drums. Where a satisfactory initial cleaning was difficult, it was found that progressively all of the metal could be reached for coating, after which maintenance of the film was a comparatively simple matter. About four years ago, with the cooperation of some of the boiler manufacturers, a specification was suggested for new equipment which aimed

to eliminate the problem of mill-scale, and at the same time permit designers or purchasers of steam generating units to provide for an interior protective coating, applied to clean, bare steel before start of operation. That specification called for tubes and drums free of mill scale, usually accomplished by pickling or sandblast. It was found that no special handling of such equipment was necessary after scale was removed. Boilers were erected and boiled out with a suitable solution to remove oil, grease, etc., after which any surface rust could be removed with a turbine brush or possibly a dull cutting head. The coating was then applied to all interior surfaces. Experience has indicated the effectiveness of this procedure.

The practice generally followed is to apply two coats to any surface not previously coated, taking care, with old or badly worn equipment, to clean out every depression or anything that resembles a pit mark, and to see that the coating is well rubbed into the bottom, finishing with an even film only. No effort is made to fill depressions or pits. A thickness greater than 3/1000ths of an inch, total depth of film, is unnecessary. The attention necessary to maintain the coating varies with conditions. Where operation is without water scale, one coat applied once every three years may be sufficient. In some cases the film has been satisfactory for much longer periods. Manufacturers make no guarantee in this connection. Single coat re-applications are being made all the way from every year to every six years. Coatings in



Applying Apexior to tubes with a "power coater."

steam turbines frequently show up in remarkably good condition after four or five years of service.

Where heavy water scale is present in boiler equipment, and no measures are available for its elimination, the effect of a protective coating is uncertain.

If a small interior area can be thoroughly cleaned, a patch may be used as an indicator. Sometimes prevention of the scale-steel bond by an intervening film has an interesting result. There is, of course, no effect on the precipitation of scale-forming solids in the boiler nor on the character of such solids. That problem remains, as always, the function of chemical or other water conditioning methods. If corrosion is present under such scale, and good cleaning is possible, then consideration may be given to the desirability of a water-tight film between porous scale and metal, so that a more or less concentrated seepage has no chance to lie, undiluted, on the metal.

It is becoming recognized, more and more, that protective coatings on inside boiler steel are justified

on much the same basis as any painting of metal elsewhere. And, there are now no operating limits since coatings are available to withstand the high temperature conditions over the present full range of operating steam pressures up to 1800 pounds gage.

Where a serious deteriorating action is admittedly present, the result is immediately apparent. Where water conditions are good and no serious need for direct protection is apparent, consideration of a defense in reserve, the extra resistance at a vulnerable point which cannot be examined every day or every month, the focusing of critical attention on the actual condition of the metal rather than the appearance of it, as well as the fundamental importance of thoroughness and good housekeeping inside the boilers, have led to a recognition of the fact that economy is served by any desirable refinement in boiler maintenance that assists, along with other means, to a complete result.

[Abstracted from "Steam Plant Engineering".]



Norwegian American Line steamer Stavangerfjord.

Installation of Exhaust Turbines Increases Speed

MANY shipowners are today confronted with the problem of modernizing their fleets without building new tonnage, which, in most cases, is out of the question on account of the small volume of passenger and freight business available. An interesting example of how this problem can be solved is afforded by the Norwegian American Line, which has equipped the passenger liner Stavangerfjord with Bauer-Wach exhaust steam turbines, thus bringing

her performance up to modern demands for speed and economy.

This steamer was built in 1918 by Cammel Laird & Co., and is of 13,156 tons gross. She is equipped with eight Scotch boilers having a total heating surface of 24,600 square feet, and generating saturated steam at 220 pounds working pressure. Her twin screws are driven by two quadruple reciprocating engines with cylinders of $26\frac{1}{2} \times 37\frac{1}{2} \times 53 \times 76$ inches diameter by 54-inch stroke. These engines, be-

fore conversion to the Bauer-Wach exhaust turbine system, developed a total output of 10,400 indicated horsepower, and the steam consumption of the main engines and propelling auxiliaries was estimated to be 146,000 pounds of steam per hour. The addition of the Bauer-Wach turbines was guaranteed to reduce the steam consumption by 21.5 per cent. at an output of 10,400 indicated horsepower, or to increase the output to a maximum of 13,800 indicated horsepower, both with a vacuum of 28.5 inches in the main condenser.

The order for this conversion was placed with Deschimag of Bremen in the summer of 1931, and the turbines and gears were manufactured in the engine shop of the Weser yard in the fall of 1931. The guaranteed performance was exceeded by a wide margin on her trials and during the succeeding trip to Oslo. The Stavangerfjord left Oslo on her first commercial trip with the new equipment on March 8 and arrived in New York on the morning of Friday, March 18. In spite of adverse weather conditions and the necessity of traveling at reduced speed on account of fog during the latter part of her voyage, she arrived on time, averaging fully 18 knots for several days, while her best voyage across the Atlantic prior to her conversion was at an average speed of 16.4 knots. The officers and engineers expressed themselves as highly satisfied with her performance on this first run.

Wind Resistance of Ships' Hulls

(Continued from Page 232)

the anchor chain would give the wind resistance.

The wind resistances naturally would be for wind velocities such as ordinarily encountered under weather conditions but they can be taken so accurately that a formula can be derived which would be possible to extend to higher values.

The main point is that where there is an absence of tide, actual windresistances can be obtained for full size ships which can be compared with wind tunnel experiments on the models; another advantage of this method is the low expense necessary to get extremely accurate results.

Use of Materials-Handling Equipment in Mexico

By R. G. Glover

Assistant U. S. Commercial Attache, Mexico City

THE most common method of moving cargo on steamship piers at Mexican ports is by hand; that is, by the use of hand trucks, or, in many cases, on the backs of peon laborers. In such ports as Tampico and Vera Cruz, the two principal ports of Mexico, naturally the bulky cargo is moved by cranes from the hold of the ships to the piers, and from there is trucked by hand to the warehouses.

In many of the smaller ports, where there are no modern docks, cargo is loaded on lighters and in some instances the lighters are rowed to shore by hand. In such cases the stevedores generally contract to move the cargo for so much per ton, and, rather than purchase a motor boat, they prefer to use hand labor in handling the lighters. Generally speaking, most of the cargo unloaded from steamships is handled by the stevedores for so much per ton. This rate varies considerably.

In railroad freight warehouses, movement of cargo is generally by day labor, which is paid on the average of 2 pesos (about \$0.66) per day where hand trucks are used. The same system applies to inter-plant movements of materials.

Hand Trucks

A considerable quantity and a wide variety of hand trucks are used in Mexico. The hand-lift trucks are very popular and are used extensively. Not only does almost every warehouse use this type but the larger banks also make use of them in moving the large quantities of silver necessitated by the fact that nearly all money transactions in Mexico are in silver pesos. The Post Office Department is another large user of the hand-lift truck.

The two-wheel coaster hand truck is, of course, used very extensively in all places where freight is handled a short distance. This is the only type of hand truck made locally, so far as is known.

Portable elevators, so far as known, are in use only by the two steel plants in Mexico.

Industrial Trucks and Tractors Propelled by Power

Only a few industrial tractors

and trucks are yet employed in Mexico. Several years ago a concern in Tampico imported six 20-horsepower gasoline tractors, to be used in transferring cargo on the municipal docks. This company equipped all of their tractors with trailers, and the results obtained were quite satisfactory. Later they retired, and the concern which took over their contract continued to use these tractors.

The National Railways likewise installed six industrial tractors operated by storage batteries. The officials have been so well satisfied with the results that, as soon as business conditions permit, they plan to buy several more of this type of tractor.

So far as is known, the two concerns mentioned above are the only users of this type of tractor. The numerous small manufacturing plants have not yet reached the proportion that requires any large use of industrial tractors and trucks. Their output is quite small, and the necessity for transferring materials long distances is naturally much less important than in the case of large plants.

[Commerce Report]

Radio on the

S. S. Manhattan

MACKAY Radio and Telegraph Company installation engineers are now installing four kinds of radio equipment on the new United States Lines' liner Manhattan. These installations include the lifeboat radio equipment, the standard radio equipment, the emergency radio, and the Kolster radio direction finder. This work is being done at the shipyard of the New York Shipbuilding Company at Camden, New Jersey, where the Mackay company recently completed equipping four of the new Export Line vessels with long range radio telegraph apparatus.

Of special interest is the lifeboat equipment on two power lifeboats. This is being installed to comply

with the regulations of the British Board of Trade which require that each vessel having ten to nineteen lifeboats must have one of them equipped with power and must carry a radio sending and receiving set.

The transmitter and receiver are each of a new type. The transmitter operates on a frequency of 500 kilocycles, more commonly referred to as 600 meters. It is small and compact and is all contained in a water-proof case with all of the controls on the front panel. It is powered by a small storage battery and a small generating set.

The receiver is a three-tube set with the B batteries contained in the case. It operates on a wave band of 550 to 1000 meters. The antenna is carried on collapsible masts.

In the event of disaster, the sets will prove invaluable in enabling the lifeboats to keep in touch with rescue ships and with each other. The installation is expected to be completed about the first of June.

Book Review

WIRE SPLICING. By R. Scot. Skirving. Handbook of 50 pages, neatly bound in cardboard and well illustrated. Published by Brown, Son & Ferguson, Ltd., Glasgow, Scotland. Price 2 shillings.

In this handbook on the art of splicing wire rope, the author tries to describe, in as clear language as possible, the methods of splicing that he thinks are best, and to describe with great detail so that "apprentices, junior officers, and yachtsmen who may have no one to teach them may follow directions with profit and pleasure." We think the author has succeeded admirably in this endeavor.

Trade Note

To Rebuild Lighthouse. — The United States Bureau of Lighthouses has announced that it will rebuild Redding Rock Light, located on a small rock five miles off the California Coast. The lighthouse was destroyed by a violent storm during the past winter. Work will be done by the 18th Lighthouse District at San Francisco. When re-established the light will be flashing white. It will be entirely automatic, burning acetylene gas, and equipped with a sunvalve which cuts off the gas supply during the daylight hours.

Flashing Lights to Facilitate Navigation

By G. R. Putnam

BUOYS have three primary purposes, first, to indicate the sides of channels and entrances; second, to mark obstructions; third, to show good water. It has long been the practice of maritime nations to distinguish between these purposes in the painting of the buoys, ordinarily using the colors red and black for the respective sides of the channel, horizontal bands for obstructions, and vertical stripes for mid-channel marks, and this, together with a partial distinction by the shapes of the buoys, has well met the needs of day navigation. But by night the distinctions have not been carried further than to indicate the two sides of the channels or entrances by red and green lights respectively, or either of these on its proper side with white lights on the opposite side. Thus up to this time no light distinctions have been provided either for obstructions or for fairways. With respect to period and length of flash, 100 different characteristics of intermittent buoy lights are in use in the United States, but no systematic significance has been attached to these variations.

The rapid increase in the use of lighted buoys and the demands for facilities for the prompt movement of vessels have increased the importance of more systematic and complete systems of buoyage, and the technical advance in flashing mechanisms and in illuminants, using either gas or electrical sources, makes it now possible to provide distinguishing light characteristics, and thus further to increase the safety and efficiency of navigation.

When it is considered that a large number of lighted buoys may be visible at one time, and that they may be in the vicinity of city and other shore lights, it is important that a system of buoyage lights be as simple as possible, both in signification and in mechanical operation. In working out an arrangement, therefore, it was concluded that it should, so far as practicable, avoid a requirement for the counting of flashes or for the timing of the length of flashes. Close navigation in buoyed channels is not a good time for counting or timing flashes, particularly considering the possible effect of the rolling of the buoy. As only two colors, beside white, are available, and as red and green must be used for the respective sides of channels and of entrances in the lateral system, it is found impossible, at least at present, to meet the other necessary requirements by additional color differentiations. But the necessary distinctions may be provided within the limitations stated, by the use of flashing equipment.

The following system is proposed. For all lighted aids marking obstructions use quick-flashing lights, and for buoys indicating mid-channel or good water, including landfall buoys, use lights with groups of short and long flashes.

The quick-flashing light should have not less than about 75 flashes per minute, with a fairly short length of flash, not longer than about 0.3 second. Ordinary flashing and occulting lights should then be restricted to not over 30 light intervals per minute, with length of flash preferably not shorter than about 0.5 second. With this separation, the quick-flashing light has been found to be an excellent signal, which the navigator may recognize at once by simple perception, without timing, and it is a signal which may readily be distinguished from all ordinary intermittent lights.

The quick-flashing light (scintillating light) has long been in use in lighting systems, and attention was called to its value by the Spanish delegation at the recent Lisbon conference, but it has not heretofore been definitely proposed to utilize its great distinctive value by giving it a special significance in buoyage systems, as for example, to indicate obstructions.

There is also proposed a valuable variation in the quick-flashing light, by imposing on it an appreciable occultation or dark interval. This may be called an interrupted quick-flashing light. Four such lights have been under test on buoys in Chesapeake Bay for about a year, and they have been found entirely practicable, and reliable mechanically, and from the navigational point of view they have proved to be very distinctive signals. The lights tested have shown short flashes at the rate of from 75 to 100 flashes per minute, with flashes continuing for about 4 seconds and interruptions of from 3 to 4 seconds. The required features of this light are that it be quick flashing, with a number of flashes not less than 6 or 7 in each flashing period, and an interruption covering the length of several flashes, so that the interruption is readily perceptible as a dark interval in a series of quick flashes, without requiring either counting or timing. This interrupted quick flash is suggested for lights for marking wrecks, and its use for that purpose should avoid the several objections which exist to the special assignment of either the red or the green colors to the marking of wrecks by night. Green lights are widely used for the lateral marking of channels and entrances, and are popular with mariners for this purpose, and this use is increasing. In the interest of simplicity and avoidance of confusion, it is desirable not to use either the red or green color as a general distinction for wreck-marking lights, or for any other purpose in the lateral system than to indicate the sides of channels. It is too much to ask of the mariner that he recognize entirely different significations of the green light according as to whether it shows one or two flashes or three or four flashes. He should not have to count any large numbers of flashes of buoy lights in close waters; there is risk of confusion in rough waters due to the motion of the buoy. Also he should not be subjected to the danger of confusion due to the use of a light color, as green, on one side of the channel for one purpose, and on the opposite side of the channel for another purpose, if a wreck happens to lie on the red side. It may be that the interrupted quick-flashing light may be assigned optionally to other especially important uses which would not interfere with the above; it is perhaps too valuable a characteristic to be confined to such infrequent use as wreck marking.

On the foregoing system the obstruction buoy light would be white, unless it is desired to indicate on which side it is to be passed, and the mid-channel buoy light would be white. The use of white lights would be an advantage for buoys marking offshore rocks, because of the greater range of visibility of the white light. But the quick-flashing light would be made red or green whenever it is desirable to add to its significance directions as to the side on which it should be passed. For example, the light on a buoy marking a rock or the end of a middle ground may be quick-flashing red or

quick-flashing green when it is desired to indicate the preferable side for passing or the better channel, or it may be white if it may be passed on either side without preference. The same would be applied to the interrupted quick-flashing light on buoys marking wrecks, which would be red or green if the wreck is to one side or the other of the channel, or white if it may be passed on either side. If lighted buoys are placed at each end of the wreck with a passage on either side, these should have lights of appropriate red or green colors respectively, according to the position of the wreck in relation to the channels.

This plan would not be unduly expensive, considering the gain that would result, in increased safety to navigation. As the average proportionate time of the flash may be kept not greater than at present, there need be no increase for gas or electricity consumed. The flashers above described would presumably cost little more than the present apparatus. Some additional flashers would be required, so that the stock at supply stations and on lighthouse tenders might include the necessary spares. A moderate proportion of flashers now in use would have to be readjusted to either quicker or slower flashing, so as to eliminate all flashers showing between 30 and 75 flashes per minute. As there is now no system of flashing lights in force that would conflict with that proposed above, there would be no urgency as to the time allowable for making the change, and whatever time is convenient could be taken for completing the shift. The many flashing and occulting combinations of 30 or less flashes per minute would still be available for all other lateral buoyage, permitting differentiation where desired; the value of such distinctions might be increased by limiting the characteristics to certain standard periods.

The plan above does not require the use of multiple flashes, with particular significance assigned to certain numbers of flashes. However, the differentiation of the two sides of the channel by a double flash on one side and a single flash on the other, or by even and odd numbers of flashes, is in use to some extent.

This differentiation by rhythm would have a special value where it is desired for any reason to use white lights on both sides, or where a white light may for differentiation be placed between colored lights on either side. The speed would be limited as for ordinary intermittent lights.

All that is said above as to buoy lights applies, of course, so far as practicable, to lighted beacons and fixed structures which serve a purpose similar to that of buoys.

It is fortunate that there is no confusion between buoy lights and ships' running lights; the latter are always fixed, and by their relationships are readily distinguishable from buoy lights. Although the colors red, green, and white must necessarily be employed both for lights on navigational aids and for ships' lights, and although the relations of the colors of the ships' lights to the buoy lights must be reversed half of the time, there appears to be a complete absence of confusion or danger from this cause. This statement is based on the positive evidence of very long experience and widespread actual use by seamen.

To summarize, the system proposed is to use quick flashing lights to indicate dangers and obstructions, interrupted quick-flashing lights to mark wrecks, lights with grouped short and long flashes to indicate good water, and other flashing and occulting lights to show the sides of channels and entrances in the lateral system. The use of red and green lights in lateral buoyage would be confined to the indication of the sides of channels and entrances, but these colors would consistently be added to the above where desirable to indicate the side on which to be passed. The sides of channels could also be distinguished by double or single flashes, respectively, such flashes being of equal length. The above simple general requirements leave ample room for special additional characteristics where desired for differentiation in particular cases, by the use of variations in periods and duration of flash, within the necessary limitations for each group.

[Reprinted from the Lighthouse Service Bulletin]

UNITED STATES SHIPPING BOARD

BUREAU OF RESEARCH

SUMMARY OF THE
EMPLOYMENT OF AMERICAN STEAM AND MOTOR MERCHANT VESSELS
OF 1,000 GROSS TONS AND OVER MARCH 31, 1932
(Does not include Lake or River Tonnage)

REPORT
B.R. No. 300
Table I

Services	Combination Passenger and Freight		Freighters		Tankers		Total	
	No.	Gross Tons	No.	Gross Tons	No.	Gross Tons	No.	Gross Tons
PRIVATELY OWNED								
*Nearby Foreign	42	216,760	28	91,887	84	582,135	154	890,782
Overseas Foreign	57	568,443	138	763,694	20	144,667	215	1,476,804
Coastwise	77	410,238	364	1,550,053	186	1,251,942	627	3,212,233
Laid up Vessels	41	253,615	246	999,684	80	485,260	367	1,738,559
Total Privately Owned	217	1,449,056	776	3,405,318	370	2,464,004	1,363	7,318,378
GOVERNMENT OWNED								
*Nearby Foreign	**2	19,244	**2	5,201	-	-	4	24,445
Overseas Foreign	-	-	116	686,750	-	-	116	686,750
Coastwise	-	-	-	-	-	-	-	-
Government Service	-	-	1	8,292	-	-	1	8,292
Laid up Vessels	4	82,919	8237	1,324,427	-	-	241	1,407,276
Total Government Owned	6	102,093	356	2,024,870	-	-	362	2,126,763
Total American Fleet	223	1,551,149	1,132	5,429,988	370	2,464,004	1,725	9,445,141

*Nearby includes Canada, Mexico, Central America, West Indies and North Coast South America to and including the Guianas.

**Panama R.R. Vessels.

^aIncludes 1 Panama R.R. Vessel.

^bIncludes 48 Vessels under 2,000 gross tons aggregating 72,486 gross tons.



American Shipbuilding

Edited by H. C. McKinnon

New River Boat for Yukon.—Plans have been completed by W. C. Nickum and staff, naval architects, 400 Polson Building, Seattle, and bids will be called about June 1 for the construction of a large stern-wheel river steamer for the United States Department of the Interior, Alaska Railroad, with headquarters at the Bell Street Terminal, Seattle, Wash.

An almost exact prototype of the famous old Mississippi and Columbia River stern-wheelers, this ship will be used as a connecting link between the Alaska Railroad's northernmost terminus on the Tenana and Yukon rivers. She will be built at Nenana from parts fabricated in the States and shipped via boat to Seward, thence by rail 400 miles northward to the river bank. The vessel is to be completed by the opening of navigation season on the Yukon in 1933.

The new ship will be of unusually light construction, a typical river craft, with rigid fir hull and cedar and fir deckhouse. To insure strength with this light construction, she will be hog-trussed with rod and wire braces at seven points on her hull and with three masts running down to her keel. She will draw only 3 feet 6 inches of water loaded with 300 tons of freight and a full crew, supplies and water. She will have accommodations for 100 passengers.

Principal characteristics are:

Length over-all	235'0"
Length between perpendiculars	210'0"
Depth	 6'0"

Draft (maximum loaded) ... 3'6"

A heavy duty, iron, fire-tube, locomotive-type boiler will be installed. This boiler will have a large fire-box and furnace front especially designed for burning wood slabs to be loaded at the various landings along the river. (Several gangs of native wood cutters will be given regular employment getting out the fuel supply.) These boilers will supply steam at 220 pounds pressure to the two tandem compound engines driving the stern wheel.

The main deck will carry the fuel supply, freight, boiler amidships, and engines aft, together with cold-storage room and deckhand quarters. The upper deck will have twenty-four 2-berth staterooms and observation saloon forward, and dining hall, galley, smoking room, and lavatories aft. Officers' quarters will be located on the texas deck, with pilot house atop this space.

A specially designed hydraulic ram type steering gear will be fitted to assure quick turning of her six rudders. Four large rudders will be fitted forward of her paddle wheel under the counter, and two extra monkey rudders will be fitted aft of the wheel. This combination will give unusually quick turning ability in swift waters. Steam-driven refrigerating machinery and steam turbine-generators will be fitted. All decks will be canvas covered, linoleum floors laid throughout all passenger quarters, and hot and cold water will be piped to each stateroom. A steam cargo

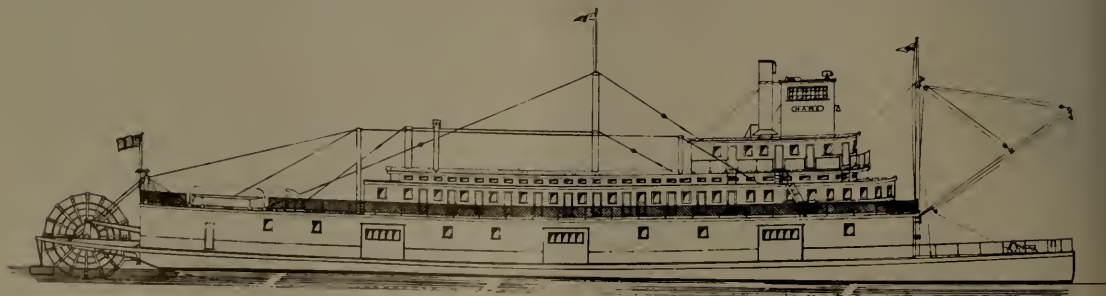
winch will be fitted, and steam capstans for pulling over rapids.

Plans call for all parts to be fabricated and fitted so that as much of the erection as possible can be done by unskilled native labor at Tenana, located 40 miles from Fairbanks. Cost of the vessel is estimated at between \$180,000 and \$200,000 complete.

Machinery Repairs.—As we go to press the British motorship Silverhazel is reported to be nearing the port of San Francisco under tow of the Merritt-Chapman & Scott salvage tug Peacock. The motorship is reported to have suffered a general machinery breakdown 1005 miles south of San Pedro.

Completes Cuzco Repairs.—Todd Dry Docks, Inc., Harbor Island, Seattle, Wn., recently completed repairs and betterments to the Grace Line steamer Cuzco operating in the West Coast of South America trade. Work on the vessel included bottom repairs and the installation of a streamline rudder. Extensive engine repairs were also performed, and the vessel was returned to service in first class condition.

New Coastwise Liner.—The Steamship Saint John, first of two fine new passenger and cargo vessels for the Eastern Steamship Lines of New York, went into service last month. The vessel was built by the Newport News Shipbuilding & Drydock Co., and a sister ship, the Acadia, will be completed this summer. The vessels are



Outboard profile of the projected stern-wheel, wood-burning river steamer for the Alaska Railroad.



Fine new coastwise liner Saint John on her trials.

intended for service between the ports of New York and Boston and the Canadian ports of Halifax and Saint John.

The Saint John is 402 ft. over all, 387 ft. between perpendiculars; 61 ft. beam; and 29 ft. molded depth, with a maximum load draft of 20 ft. They have accommodations for 745 passengers and a crew of 178. Cargo capacity comprises 159,000 cubic feet. Each vessel is powered by two sets of single reduction geared compound turbines of the Newport News-Parsons type working under a pressure of 375 pounds and a temperature of 650 degrees Fahrenheit at the boiler and developing about 11,400 shaft horsepower. Babcock & Wilcox water-tube boilers, fitted with Todd fuel oil burners, supply steam to the turbines. Each vessel has a guaranteed sea speed of 21 knots.

All deck auxiliaries and most of the engine room auxiliaries are electrically driven, General Electric Company having supplied generating sets. The vessel is beautifully finished as to passenger accommodations, and has all the most modern equipment for safety and comfort of passengers and crew. Sperry Gyroscope Company supplied the gyro-compass, two-unit gyro-pilot automatic steering system, one self-synchronous rudder indicator, and two searchlights.

The vessels were designed by Theodore E. Ferris of New York and are probably the finest in the American coastwise service.

Shipyard Bids.—It is interesting to note the wide range of bids submitted by Atlantic Coast and Gulf



Above are shown three views of passenger accommodations on the steamship Saint John, namely, promenade deck, main lounge and dining saloon.

Coast shipyards for the reconditioning work proposed by the Mississippi Shipping Company on the freighters Delmundo (ex-Casey) and Delvalle (ex-Clavarack). The bids showed a variation of 45 per cent. between high and low. They were as follows:

Bidder	"Casey"	Time Days	"Clavarack"	Time Days
Newport News Shipbuilding & Drydock Co.				
	\$173,960	45	\$177,840	60
Alabama Drydock & Shipbuilding Co.—Mobile				
	201,602	95	206,280	115
Bethlehem Shipbuilding Corp., Ltd.—Baltimore				
	237,796	95	247,603	95
Todd Shipbuilding & Dry Dock Co.—Mobile				
	238,000	125	...	...
Todd Shipbuilding & Dry Dock Co.—New Orleans				
	...	...	243,882	125
Johnson Iron Works, Dry Dock & Shipbuilding Co.—New Orleans				
	244,540	100	248,138	120
United Drydocks, Inc.—New York				
	255,596	90	260,731	90

The contract has been awarded to Newport News Shipbuilding & Drydock Company on a total cost basis of \$351,800 for the two ships. Work will consist of modernizing the machinery and changing of deck arrangements and addition of a limited accommodation for the transportation of passengers. In addition to the shipyard work, the owners will supply additional furnishings at a cost to bring the total reconditioning cost up to about a half million dollars.

Bids Called for Boilers.—Sealed bids will be opened June 2 at the office of the U. S. Engineers, 321 Customhouse, Portland, Ore., for furnishing two boilers capable of generating in total 45,000 pounds of steam per hour and installing them in the U. S. dredge P. S. Michie while it is berthed on Willamette River at Government Mooring, Portland. Boilers are to be of the marine water-tube type.

Moves Offices.—G. Bruce Newby, well known California naval architect, has moved his offices from San Pedro to 1345 West Ocean Avenue, Long Beach, Calif., effective June 1.

1000-H.P. Towboats.—Midland Barge Co., Midland, Pa., has been awarded contract for the construction of two 1000-horsepower towboats by the Inland Waterways Corp., 1016 Munitions Bldg., Washington, D. C. The boats will have the following general characteristics:

Length	160'
Breadth	40'0"
Depth, at side	8'0"

Crown 0'6"

Bow—Model with sponson

Draft 4'2"

These towboats will be of steel construction, with tunnel type stern, and stern wheel propulsion. The power plant of each boat will consist of two McIntosh & Seymour diesel engines of the type M-8-25-22-S, vertical 8-cylinder, 4-cycle, single-acting, mechanical injection. The engines will have the following ratings: normal, 590 brake horsepower at 300 revolutions per minute, 72 pounds BMEP, 1100 feet per minute piston speed; maximum continuous, 675 brake horsepower, 330 revolutions per minute, 75 pounds BMEP, 1200 feet per minute piston speed. These engines have 12½ inches bore, 22 inches stroke; main bearings 8¼ inches diameter, 6¾ inches long; crank shaft in one section having eight cranks for power cylinders; crank pin 8¼ inches diameter 6¾ inches long; piston pin 6 inches diameter 5½ inches long; flywheel 9 inches face, 3 feet 4 inches diameter, 2500 pounds approximate weight; net weight of engine approximately 53,000 pounds.

The engines and auxiliaries are being supplied by the owners. Following is a synopsis of bids submitted by the shipyards for the construction of the boats:

Bidder	First Towboat	Amount Bid Time Days	Second Towboat	Time Days
Pennsylvania Shipyards, Inc.	\$141,000	210	\$135,000	255
Nashville Bridge Co.	114,800	365	98,800	425
Dravo Contracting Co.	134,740	303	94,740	333
Midland Barge Co.	103,000	360	91,000	420
Dubuque Boat & Boiler Co.	118,750	365	100,000	395
McClintic-Marshall Corp.	120,800	360	113,200	425
Howard Shipyards & Dock Co.,	127,743	365	115,243	425
Ingalls Iron Works Co.	134,750	365	123,850	480
Marietta Manufacturing Co.,	137,700	360	119,300	420
Alabama D.D. & Shipb'd'g Co.	143,924	365	133,589	395

Delivery Date Set.—Date for delivery of the Steamship Manhattan, largest American-built liner, to the United States Lines by her builders, the New York Shipbuilding Company, is set for July 24; and announcement has been made by the Roosevelt Steamship Company, managing operators of the United

States Lines, that the vessel will sail from New York on her maiden voyage to Europe on August 10 of this year.

Bids Called on Recondition Job.—Swayne & Hoyt, Inc., 215 Market St. of San Francisco, has called for bids to be submitted for the reconditioning work on two freighters operated in the Gulf Pacific Mail Line under terms of the mail contract awarded by the Postoffice Department and the Merchant Marine Act, 1928. At this time the work will incorporate simply the fitting of low pressure Bauer-Wach exhaust turbines and Westinghouse exhaust turbines to the freighters Point Ancha and Ossining. The new machinery has already been ordered by the owners.

North Star Holds Satisfactory Trials.—Motorship North Star, the new Alaska service vessel for the Department of Interior, Bureau of Indian Affairs, recently completed by the Berg Shipbuilding Company, Seattle, underwent satisfactory trials on Puget Sound last month. Her performance both in handling and in the operation of her machinery were declared to be satisfactory. She is 210 feet long, of wooden construction, and is powered by a 1500-horsepower McIntosh & Seymour diesel engine. Complete description of the vessel appeared in the April issue of Pacific Marine Review.

Chippewa in Service.—The ferryboat Chippewa, owned by the Puget Sound Navigation Company of Seattle, has been reconditioned for service between Seattle and Bremerton, and recently went into service on this route. The ferryboat has been almost entirely rebuilt and has been equipped with a new 2200-horsepower Busch-Sulzer diesel engine. The work was done by the Lake Washington Shipyards, Houghton, Wn., and cost approximately \$200,000. Her superstructure has been rebuilt to make her into an observation type ferryboat with accommodations for 1200 passengers. Her present speed is 16 knots. Complete description of this job with trial data will appear in the next issue of this magazine.

Large Suction Dredge Launched.—The General Engineering & Drydock Company, Oakland, Calif., launched for the American Dredging Company on May 3 the suction

dredge Marshall C. Harris. The vessel was named for the president of the owning company, Mrs. Nicholas R. Harris, his mother, being the sponsor. This craft is to be equipped with powerful electrical dredging machinery to receive power from shore stations. The dredge is 150 ft. between perpendiculars, 45 ft. beam, 12 ft. depth. Machinery installation is being made by the Golden State and Miners Iron Works.

Contract for Tug.—Spedden Shipbuilding Company, Baltimore, Md., was low bidder for the construction of a tug for the U. S. Public Health Service Quarantine Service at New Orleans. Following is a synopsis of bids:

Spedden Shipbuilding Co., \$44,412 and 250 days; Fairbanks-Morse engine.

Bath Iron Works, \$50,564 and 200 days; Fairbanks-Morse engine.

Norfolk Shipbuilding Co., \$53,677 and 180 days; Fairbanks-Morse engine.

Southern Shipyard Corp., \$56,275 and 200 days; Fairbanks-Morse engine.

Tamp Shipbuilding Co., \$62,130 and 135 days; Winton engine; \$61,130 with Fairbanks-Morse engine.

Old Dominion Marine Railway Corp., \$75,000 and 210 days; engine not specified.

The vessel is to be a single-screw, flush-deck type, with slightly raking stem and special type of transom stern. On the main decks there will be a raised pilot house forward with hospital below, aft of which will be a saloon for officers or passengers, followed by a trunk over the engine room and terminating in a freight compartment at the stern. Dimensions are 70 ft. overall; 16 ft. 11 in. beam over guards; 16 ft. molded beam; 8 ft. loaded draft; 10 ft. 10 in. depth. The shell plating will be of wrought iron with steel framing and steel deck houses.

The engine will be a 6-cylinder, 210-horsepower, directly reversible, full diesel type. There will also be a combination unit consisting of a diesel engine, a 3-kilowatt direct-current generator air compressor, and a water pump. The vessel will be heated by a hot water system operated by oil-burning gravity type heater. The tug is intended for quarantine boarding service at New Orleans and will have a speed of 9.5 knots. T. J. Liddell is surgeon, U.S.P.H.S., in charge of this station.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of May 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W., Seattle, Wn.
North Star, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Bell St. Terminal Seattle, for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1500 H.P. McInch & Seymour diesel eng.; 14 knots speed; launched 1 18 32. delivered 4/28 32.

GENERAL ENGINEERING & DRY DOCK CO.,

Oakland, Calif.
Purchasing Agent: A. Wanner.
Marshall C. Harris, hull 26, suction dredge for American Dredging Co., San Francisco; 150 L.B.P.; 45 beam; 12 depth; keel 11/23/31. launched 5/3/32.

U. S. NAVY YARD,

Bremerton, Wash.
Aetoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1 30. deliver 2/12 32 est.
Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed

U. S. NAVY YARD,

Mare Island, Calif.
San Francisco, light cruiser CL-38 for United States Navy, 10,000 tons displacement; keel 9/1 31; deliver 2/11/34 est.

LAKE WASHINGTON SHIPYARDS,

Seattle, Wn.
Remodeling and installing new diesel engine Ferry Chippewa; completed 4/18/32.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP.,

Ltd., Union Plant
Drydock, clean, paint, misc. repairs; stmr. Emma Alexander, stmr. Warwick, stmr. Herira, stmr. Point Caleta, m.s. Australia, stmr. Tojon, tug Lebec, Barge No. 1, stmr. Har-Monger, stmr. Korrigan III, stmr. President McKinley, stmr. President Coolidge, stmr. Admiral Laws, dredge A. MacKenzie, U. S. S. California, stmr. Forbes Hauptmann, stmr. Mariposa. Straighten one end of fuel valve lever m.s. Aramis. Make four bolts for crosshead side rods; m.s. New Zealand. Install 3 electrolysis eliminators; m.s. Moloka. Make and furnish 24 Damara springs; m.s. Mojave. Make and furnish 36 standard keys and 36 big screws; stmr. Lebec. Line up and paint Plimsol marks; m.s. Herira. Anchor chain repairs; stmr. La Placeta. Repair low pressure ahead eccentric pump stmr. Point Caleta. Retube one cooler and furnish two machinists; m.s. Otokia. Misc. repairs; stmr. Oleum, launch Oakland, launch Ubuyu Maru, stmr. Limon, stmr. Hardanger, stmr. Talamanca, stmr. Chiriqui, stmr. Antigua, stmr. President

Van Buren, stmr. Talamanca, stmr. President Hoover

THE MOORE DRY DOCK COMPANY,

Oakland, Calif.
Drydock and misc. repairs during April. Standard Oil barge No. 2, U.S.A.T. St. Michel, barge Chas. Nelson, m.s. Californian, stmr. West Ira, m.s. Beulah, Laurel, Elizabeth, U. S. C & G boat Guide, stmr. Golden River, barge Fruto, Hyades, stmr. Maliko, ferryboat Feather River, Chirikof, ferryboat City of Sacramento, stmr. Vanguard, tug Hercules, stmr. Ohioan, stmr. Santa Ana, Bering, stmr. Virginian, Elwin C. Hale, Crockett.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Docked, cleaned, painted, misc. hull and machinery repairs: Prov. govt. police launch P. M. L. 8. Docked and misc. repairs: Dept. marine patrol launch: Hivids. Docked, cleaned, painted, misc. hull repairs: Can Fish & Cold Storage Co. three camp scows. Docked, cleaned, painted, misc. hull and engine repairs: 5 fishing boats. Misc. hull and engine repairs not requiring docking: 37 fishing boats, 45 commercial jobs.

U. S. NAVY YARD,

Bremerton, Wn.
Repairs and docking: Tennessee, Lexington, Talbot, Greer, Clayton, Elliott, Gan-net. Misc. repairs: Arkansas, Eagle No. 11, Eagle No. 32, Eagle No. 38. Eagle No. 37. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS

Bath, Maine
Icarus, hull 152, twin screw, steel patrol boat for U. S. Coast Guard; 165 ft. long; diesel eng.; keel 7/22 31, launch 3/19/32; delivered 4/20/32.

Perseus, hull 153, same as above; keel 9/15/31, launched 4/11/32; delivered 4/22/32.

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed; deliver 6 11 34 est.

Not named, hull 155, quarantine tug for U. S. Public Health Service, Boston; 60 ft. long, 15 ft. beam, 7 ft. depth.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington, D.C.; 131 long, 24'6" molded beam, 8'6" molded draft, 500 H.P. eng.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,

Quincy, Mass.
Portland, light cruiser CL-33, 10,000 tons displacement; deliver 8 15 32 est.

Monterey, hull 1441, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam, 22,000 gr. tons; 20 1/2 knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 10 10 31; delivered 4 29 32.

Lurline, hull 1447, sister to above; deliver Jan. /33 est.

Quirigua, hull 1445, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17 1/2 knots speed, 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 2/6/32.

Veragua, hull 1446, sister to above; launched 4 23 32.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed; deliver 2/11/34 est.

BETHLEHEM SHIPBUILDING CORP., LTD.,

Baltimore, Md.
Hull 4289, dredge hull for Ellicott Machine Co., Baltimore.

COLLINGWOOD SHIPYARDS, LTD.,

Collingwood, Ontario
Purchasing Agent: E. Podmore.
Wm. J. Stewart, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 m loaded speed, twin screw, T.E. engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam; keel 8 12 31, launched 4/14/32.

DEFOE BOAT & MOTOR WORKS

Bay City, Michigan
Purchasing Agent: W. E. Whitehouse.
Not named, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W.T. boilers; keel 12/15/31 est.; launch 4/15/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY,

Pittsburgh, Pa., and Wilmington, Del.
Hulls 995-997 incl., three diesel stern-wheel towboats for stock, 2 delivered.

Hull 1134, one 24-in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel sled dump scows for Contracting Dept., 115x28x7'6".

Hull 1139, steel hull, 20 in. pipeline, self-propelled, diesel-electric powered dredge for U. S. Engineers Office, St. Louis, Mo.

Hull 1140, same as above.

DUBUQUE BOAT & BOILER WORKS,

Dubuque, Iowa
Self-propelled, 16-inch suction, pipeline dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May 32 est.

ELECTRIC BOAT CO.,

Groton, Conn.
Cuttlefish, fleet submarine SS171 for U. S. Navy; keel 10/1 31; deliver 12/29/33 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.
Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination pas-

senger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32.

Santa Paula, hull 122, sister to above; keel 8/4/31; launch 6/11/32 est.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel 3/24/32.

GREAT LAKES ENGINEERING WORKS

River Rouge, Michigan

Empire, hull 279, dredge hull for Dumbear & Sullivan; 125 x 42 x 10 ft.; keel 4/4/32; launch 5/9/32 est.; deliver 5/31/32 est.

Not named, hull 280, diesel-electric tug for Ford Motor Co., Detroit; 75 L.B.P.; 2 beam; 12 loaded draft; 500 S.H.P.; keel 5/9/32 est.; launch 6/11/32 est.; delivery 7/15/32 est.

HOWARD SHIPYARDS & DOCK COMPANY,

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft.; keel 3/21/32; deliver 8/32 est.

MARIETTA MANUFACTURING CO., Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6"; launched; delivered 5/1/32.

Captain William Clark, same as above; launched; deliver 6/1/32 est.

One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9"; launched; delivered 5/1/32.

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.; 132 x 35 x 10 ft.; keel 5/15/32 est.; deliver 7/1/32 est.

MIDLAND BARGE COMPANY, Midland, Penn.

Eight floating steel caissons for Foundation Co.; 6 delivered.

One 15-ton derrick boat for U. S. Engineers Office, Huntington, W. Va.

Two steel, tunnel-stern, stern-wheel, diesel-powered towboats for Inland Waterways Corp., Washington, D.C.; 160 by 50 by 8 ft. depth; each powered by two 590 B.H.P. McIntosh & Seymour diesel engs.

NASHVILLE BRIDGE COMPANY, Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 261, gasoline engined workboat for U. S. Engineers, Vicksburg; 31 ft. length; keel 2/23/32; launched 4/16/32; delivered 4/17/32.

Hull 262, same; keel 2/24/32; launched 4/16/32; delivered 4/17/32.

Hull 263, same; keel 2/29/32; launched 4/16/32; delivered 4/17/32.

Hull 264, work boat for stock 40 ft. length; gasoline engine; keel 3/1/32; launched 4/14/32; delivered 4/17/32.

Not named, hull 265, gas launch for U. S. Engineers, Pittsburgh; 40 x 8 x 8 ft.; keel 4/27/32; launch 6/10/32 est.

Hull 766, 31 ft. workboat for U. S. Engineers, Nashville; keel 6/1/32 est.; launch 7/10/32 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Segovia, hull 345, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 tons; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 3/9/31; launched 8/15/31. (Vessel extensively burned at outfitting dock. No decision made as to rebuilding.)

Columbia, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/29/32; launch 8/32 est.; deliver 12/1/32 est.

Haiti; hull 348, sister to above; keel 4/4/32; launch 9/32 est.; deliver 12/15/32 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31; launched 1/9/32; delivered 4/22/32.

Acadia, hull 351, sister to above; keel 8/31/31; launched 2/13/32; deliver 6/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver 5/1/34 est.

NEW YORK SHIPBUILDING CO., Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31; deliver 8/15/32 est.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launched 12/5/31; deliver 7/24/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31; launch 9/32 est.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31; deliver 3/3/34 est.

Reconditioning.—Four vessels for American Scantic Lines; 390 by 54 by 32 ft.

SPEDDEN SHIPBUILDING CO., Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.; 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng.; keel 3/15/32; launch 8/1/32 est.; deliver 10/31/32 est.

Not named, hull 273, diesel tug for U. S. Public Health Service, New Orleans, La.; 71 L.B.P.; 16'11" beam; 8' depth; 210 B.H.P. Fairbanks-Morse diesel eng.; completion 250 days.

SUN SHIPBUILDING & DRY DOCK COMPANY, Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 146 single-screw steam-

ship for carrying loaded railway cars for Seatrains Lines, Inc., New York and New Orleans; 46'6" by 63'6" by 38'3"; 15½ knots speed; 8500 D.W.T.; keel 2/24/32; deliver 9/32 est.

Not named, hull 147, sister to above; keel 2/24/32; deliver 9/32 est.

UNITED DRY DOCKS, Inc.

Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Hull 807, scow for City of New York; 70 L.O.A.; 30 beam; 7'6" depth; keel 1/18/32; launch and deliver 5/16/32 est.

Irvington, hull 809, ferryboat for Rockland Boat Corp.; 64'10" L.O.A.; 29' beam; 8'6" depth; 70 H.P. diesel eng.; keel 2/10/32; launch 4/6/32 est.; deliver 4/15/32 est.

U. S. NAVY YARD,

Boston, Mass.

MacDonough, U. S. Torpedo Boat Destroyer D.D. 351 for U. S. Navy; 340 ft. long; 35 knots speed; complete 8/11/34 est.

U. S. NAVY YARD

New York.

New Orleans, light cruiser CA32, for U. S. Navy; 10,000 tons displacement; deliver 6/2/33 est.

Not named, U. S. Torpedo Boat Destroyer (D.D. 350) for U. S. Navy; 340 ft. long; 35 knots speed; complete 6/11/34 est.

U. S. NAVY YARD

Philadelphia, Pa.

Minneapolis, light cruiser CA36 for U. S. Navy; 10,000 tons displacement; deliver 10/2/33 est.

U. S. NAVY YARD

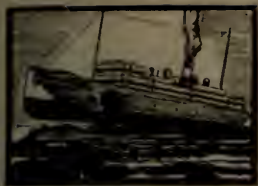
Portsmouth, Va.

Dolphin, fleet submarine SS169 for U. S. Navy; deliver 8/1/32 est.

Cachalot, fleet submarine SS170 for U. S. Navy; deliver 9/16/33 est.

Veragua Launched. — The third and last of the three passenger and refrigerated cargo steamers building for the United Fruit Company by the Bethlehem Shipbuilding Corporation, Fore River Plant, was launched May 7. This vessel, the Veragua, will be similar in every respect to her sister ships. She is 446 feet length over-all, 60 ft. beam, and 24 ft. loaded draft. The vessels have a guaranteed speed of 17½ knots. They are powered by General Electric turbo-generators developing 10,500 shaft horsepower. Babcock & Wilcox water-tube boilers supply steam. These vessels are primarily refrigerated cargo vessels for the carriage of bananas and other tropical fruits from South America to United States ports and the transportation of general cargo southbound. They are also furnished with luxurious accommodations for 113 first class passengers. Complete description, with illustrations, will appear in our July edition.

Overhaul Dredge. — Albina Engine & Machine Works, Portland, Ore., has contract for overhauling the dredge Savannah.



Marine Insurance

Edited by James A. Quinby

Seaworthiness in General Average

Recent Cases Indicate Owner has Burden of Proving Condition of Vessel at Inception of Voyage

GENERAL average sacrifices or expenditures are those successfully incurred in the face of a peril threatening the joint safety of a ship and her cargo. When such a peril arises from the force of the elements, the equity of assessing contribution to resultant sacrifices or expenditures is immediately apparent. If, on the other hand, the peril, to avert which the sacrifice is incurred, arose through the negligence of the shipowner's servants or through the initial unseaworthiness of the vessel, there would seem to be no reason in equity or public policy to enforce contribution from the cargo.

The same argument, however, may be applied to direct cargo damage resulting from negligent navigation by the shipowner's servants, and yet Congress, by the Harter Act, has exempted the vessel from liability for damage caused by negligent navigation or management of the carrying vessel. Of course, the fact that the necessity for sacrifice or expenditure for the common benefit arises through unseaworthiness or negligence makes it none the less a generic general average loss; that is, one incurred for the general benefit of cargo and ship. The right of the erring shipowner to claim contribution from cargo, however, is another matter.

In a series of cases arising shortly after the passage of the Harter Act (the *Irrawaddy*; the *Strathdon*; the *Jason*) discussed at length by Congdon on General Average, 2nd Edition, Chapter II, the courts of the United States, upon facts showing negligent navigation as a cause of peril, held that, in the absence of a valid contract to the contrary, the shipowner is precluded from claiming contribution from the cargo.

The Jason Clause

In the last of these cases (the *Jason*), the shipowner had inserted in his bill of lading a clause that later

The Fleet's in Port

San Francisco—May, 1932

A tingling of nerves at the sight of them,
Glittering, clean, and trim—
A shuddering thrill to the sight of them,
Threatening, sullen, and grim
Tolerant love for the youth of their men,
Swaggering, reckless, and gay,
These are the things that strike home to our ken
As they did in an older day
But under the clarion tumult of pride
And the glamor of turrets and guns,
A questioning voice that our fathers denied
Speaks low in the ears of their sons
What of the ships of Cervera's fleet
And the dead of Jutland's seas?
Can we doubt in the eyes of the Judgment Seat
They were ships and boys like these?
So long as our destiny rests on their guns,
Hail to the men of war,
But hasten the day when the sons of our sons
Shall see their like no more

—J. A. Q.

came to be known by the ship's name, providing that both ship and cargo should contribute to such negligently caused general averages, providing the shipowner had used due diligence to supply a vessel in all respects seaworthy and properly equipped. The so-called Jason Clause now found in bills of lading is far broader than the original clause and usually provides that, if the owners shall have used due diligence to make the vessel seaworthy, the cargo shall be liable to contribution, not only to sacrifices for perils caused by negligent navigation, but also to sacrifices for perils brought about by the initial unseaworthiness of the vessel, provided such

unseaworthiness was not discoverable by due diligence. Some clauses have even gone so far as to endeavor to enforce contribution in all cases of unseaworthiness, even though it might have been discovered by due diligence at the commencement of the voyage. Such clauses are manifestly void under the Harter Act, since they omit to include the duty laid upon the shipowner by the third section of the Harter Act.

It is to be noted that all the decided cases mentioned above dealt with negligent navigation and not with initial unseaworthiness. The legality and practical value of the modern Jason Clause as to its unseaworthiness feature have never been adequately tested. In order to recover for cargo damage under the Harter Act, it is usually sufficient to show that the vessel was actually unseaworthy at the start of the voyage. Instances are few in number where an unseaworthy ship has been absolved from liability because her defect was latent. There is no reason to suppose that the shipowner would fare any better under a rigid test of the unseaworthiness provision of the Jason Clause, since the latter arises directly from rights granted by the Harter Act. And yet cargo owners and underwriters

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309 Colman Bldg.

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are constantly honoring adjustments in which they are asked to pay contributions in cases where the peril arose from a breakdown of machinery of such nature as to arouse more than a suspicion that the vessel was unseaworthy when she sailed.

The York-Antwerp Rules

The application of general average in any given case is usually governed by the inclusion of a set of rules in the bill of lading. Prior to 1924, the rules so used were called the York-Antwerp Rules of 1890. In 1924, these rules were revised and amended, and, at the present time, some shipowners use one set of York-Antwerp Rules and some use the other. The 1890 rules have no direct provision covering negligence or unseaworthiness as a cause of a general average peril, as these earlier rules were adopted prior to the passage of the Harter Act. The 1924 rules, however, provide as follows:

"Rule D.—Rights to contribution in general average shall not be affected though the event which gave rise to the sacrifice or expenditure may have been due to the fault of one of the parties to the adventure; but this shall not prejudice any remedies which may be open against that party for such fault."

It is quite apparent that if Rule D of the 1924 rules is included in the bill of lading, there is serious doubt of the shipowner's right to recover in general average for expense made necessary by unseaworthiness. A recent significant decision on this point is the *Ettore*, 1932 A.M.C. 341 and 462. In that case, the steamer encountered a moderate gale on a transatlantic voyage, and lost her propeller, the tailshaft breaking off close to the stern bearing. Being in a position of peril, the ship incurred towage expense which was later included in a general average adjustment. The cargo owner's refusal to contribute was upheld by the Federal District Court in New York, which further made a specific finding that in such cases the shipowner has the burden of proving that the cause of the accident is not due to unseaworthiness.

The denial of general average recovery to the owner of an unseaworthy vessel is not a new principle. It was clearly enunciated in the Ninth (Pacific Coast) Circuit of our Federal Court by Judge Rudkin in *The Fort Bragg*, 1924 A.M.C. 275, a suit to recover general average expenditures under a hull policy. The court said:

"It clearly appears from the testimony that the loss was occasioned solely and directly by the unseaworthiness of the ship, not by the perils of the sea or negligence of the master or crew. It is conceded that the

general marine policy does not cover or include such losses. . . ."

In view of the law as laid down in the *Fort Bragg* and preceding cases, and the holding on burden of proof in the *Ettore* decision, the shipowner, in spite of the York-Antwerp Rules and the Jason Clause, seems faced with the almost insurmountable burden of proving the exact cause of damage in cases where his sacrifices or expenditures resulted from a breakdown or failure of some part of his vessel.

No Freight, No General Average?

NO tickee, no washee! And now the United States Court of Claims has decreed that just because an army transport carries goods free of charge, there can be no general average covering the ship and goods.

It seems that the transport *Logan*, bound from San Francisco to Manila, carried cargo belonging to various owners, which was being transported free of charge. Some or all of this cargo was covered by insurance against general average loss. A fire occurred on board the vessel and was extinguished by pouring water into the hold. This water damaged certain shipments of goods. In the case of an ordinary merchant vessel, these facts would constitute a general average of the ordinary garden variety and the ship and saved cargo would be called upon to contribute to the loss suffered by the cargo owners whose goods were sacrificed for the benefit of the venture.

The administrative officer of the United States Army Transport Service wrote to Johnson & Higgins, well-known average adjusters, and asked them to make up the adjustment, which they proceeded to do. The adjustment so drawn was correct as to its details, and the bill presented by the adjusters for their services was conceded to be reasonable. The transport service, however, refused to honor the bill or to pay any contributions, on the ground that, since the goods were carried gratis, they owed no duty to the cargo, and consequently no general average could arise. Since no general average could arise, they argued, the administrative officer must have exceeded his authority in ordering the general average statement.

The Court of Claims upheld the contention of the transport service and denied the existence of any valid ground of general average, basing the decision upon the absence of a remunerative contract of carriage be-

own the world over as a guarantee of INSURANCE MARINE AND INLAND CARGOES INSURANCE COMPANY

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Joseph Hadley & Sons, Agents

tween the ship and cargo owners. It was pointed out that the Logan was not in the situation of a vessel "that takes any cargo offered for hire."

Such language indicates that the court considered general average to be in some way the unique burden of the common carrier. Nothing could be further from the truth. The decision further points out that "general average is applied only in cases of joint adventure; that is, the parties must have a common purpose, in part at least. But in the instant case there was no common purpose, no joint enterprise or adventure in which defendant was concerned."

This reasoning appeals to us as palpably unsound. The Logan and her cargo were certainly a joint adventure, with a common purpose, whether or not any freight money was to be paid by the one to the other. They were bound together by an inexorable law of necessity, derived from the fact that they faced a common danger shared by no other interests. If one of them suffered a sacrifice to avert that danger, it would seem that contribution to that sacrifice would arise from the equitable necessity of their common relationship rather than from any assumed contract.

If the shoe had been on the other foot, the transport service might have been of a different opinion. Suppose, for example, the Logan, carrying a valuable cargo gratis, had incurred extraordinary expense to get to port in the face of impending danger. Would the owner of the ship then forego his right to claim contribution from the cargo merely because no freight was charged for the carriage? We doubt it.

Mixed Cargo

RECENT meetings of the Study Class of the Association of Marine Underwriters of San Francisco have been notable for the ability of the speakers and timeliness of the topics presented. On April 19, Miss Esther Phillips, Assistant United States District Attorney, favored the underwriters with a thorough treatment of the law of salvage. Miss Phillips, in a brief but comprehensive manner, described the elements of maritime salvage, the reasons for the doctrine, and the basis upon which salvage awards are granted. At the same meeting, F. R. Davis of Stewart and Davis, coffee and tea importers, described the raising and importing of tea.

At the meeting of May 2, Lieutenant-Commander C. W. Brewington, U.S.N., explained and advocated the

electric leader cable, by means of which ships can feel their way through mine-fields or into fog-bound harbors. The speaker strongly advised the installation of such a cable in the Golden Gate. He was followed by Walter Hays, of Marsh & McLennan-J. B. F. Davis & Sons, whose subject was "Unseaworthiness and Negligence in Relation to General Average."

On April 25, George Jordan, newly elected marine secretary of the Fireman's Fund Insurance Company, arrived at the Head Office in San Francisco from New York to formally take up the duties of his office. Following his election in February, Mr. Jordan left San Francisco to visit marine branch offices at Los Angeles, Seattle, Chicago, and the Atlantic Marine Department office in New York, where he conferred with Manager Frederick B. McBride.

M. R. Wallace, marine manager for the Boston, Anchor, and Old Colony insurance companies, has removed his offices to 238-240 Bush Street, San Francisco, where the marine department will be under the same roof with the fire and automobile departments.

George Ismon, Pacific marine manager for the Norwich Union, Phoenix of London, and Union Marine companies, has removed his offices from one end to the other of the third floor of the Adam Grant Building, 114 Sansome Street, San Francisco. George had a fine box of cigars to celebrate the opening of his new offices, but the cigars are probably all gone by now.

"Pie" Small, of the marine department of Baltour-Kessler Agencies, was quite sick some time ago. Sick abed, in fact. At the height of his indisposition, he looked out the window and saw a hearse draw up before the house. As a matter of fact, the hearse wasn't after him, at all, but had come to provide the last ride for a gentleman next door, who had been just that much sicker than Small. At any rate, the hearse was too much for Pie. He got up immediately and paraded up and down before the house, thus keeping the hearse from the door and reassuring the neighbors.

Ho, hum! Another day, another four-bits. But the overhead is \$1.37.

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Freights, Charters, Sales

May 19, 1932

THE following steamers have been fixed with grain to U.K.: British steamer Carlton, Vancouver, B.C., to Antwerp and Rotterdam, April, Dale & Co.; British motorship Titanian, Vancouver, B.C., to Avonmouth, May, Dale & Co.; British steamer Nohata, Vancouver, B.C., to U.K. Continent, April; British steamer Frumenton, Vancouver, B.C., to London, June, Dale & Co.; British steamers Grain-ton, Newbrough, and Peterton, Vancouver, B.C., to London, June, Dale & Co.; British steamer Cape Verde, British Columbia to London and Hull, May, Canadian American Shipping Co.

The following steamers have been fixed with grain to the Orient: Norwegian motorship Brand, Vancouver, B.C., to Orient, May; British steamer Castlemoor, Vancouver, B.C., to Vladivostok, \$2.40 (Canadian), spot; two Canadian Transport vessels and two steamers, Vancouver, B.C., to Vladivostok, \$2.40 (Canadian), May; British steamer City of Vancouver, Vancouver, B.C., to Vladivostok, \$2.50, spot, Dreyfus & Co.; British motorship Pacific Commerce, Vancouver, B.C., to Vladivostok, \$2.50, May, Kerr, Gifford & Co. (previously reported Canadian Transport vessel); British motorship Bronnay, Vancouver, B.C., to Vladivostok, \$2.50, May, Kerr, Gifford & Co.; Norwegian motorship Fernglan, Vancouver, B.C., to

Vladivostok, \$2.40, May June, L. Dreyfus & Co.

The following steamers have been fixed with lead concentrates: a Weir vessel, Newfoundland to Selby (San Francisco Bay), \$2., F.I.O., May; a Weir vessel, Newfoundland to Selby (San Francisco Bay), \$2., F.I.O., September October.

The following time charters have been reported: British motorship Neptunian, 1 trip, delivery British Columbia, redelivery U.K. Continent, 59, May, Canadian Transport Co.; Danish motorship Nordfarer, delivery China, redelivery U.K.

Continent, via North Pacific, 80 cents, April May, W. L. Comyn & Sons; Norwegian motorship Bel-janne, 1 trip, delivery British Columbia, redelivery U.K. Continent, May June, Canadian Transport Co.; British steamer Silksworth, delivery Vancouver, redelivery U.K. Continent, April, Canadian Transport Co.; Danish motorship Nordbo, delivery China, redelivery U.K. Continent, via North Pacific, 80 cents, June, W. L. Comyn & Sons; Danish motorship Nordkap, 1 trip, delivery China late May, redelivery U.K. Continent, Bordeaux Hamburg Range, via North Pacific, 80 cents, W. L. Comyn & Sons.

The following sales have been reported: American steamer Ossining U. S. Shipping Board to Swayne & Hoyt, \$100,000.; American steamer Brunswick, National S. S. Co. to Hammond Little River Redwood Co., Ltd.

PAGE BROS., Brokers

Trade Literature

Port Charges. The 1931 edition of Miscellaneous Service Report No. 1, entitled "Port and Terminal Charges at United States Ports" has just been issued by the Board of Engineers for Rivers and Harbors of the War Department, in co-operation with the United States Shipping Board. The original volume costs \$1.25 and the supplement 15 cents, obtainable from Superintendent of Documents, Government Printing Office, Washington, D. C.

Worthington.—Here is a list of new catalogs, bulletins, etc., recently released by Worthington Pump and Machinery Corp., Harrison, N. J.: No. L-400-B2A, Multi-V-Drives; W-1200 B2, rock drills; L-620-S2, air compressors; S-500-S7, marine diesel engines, 50-150 H.P. sizes; S-500-S3 and S-550-S2 gas engines; W-800-B9, disk type water meters.

A Wonder Book of Rubber, just issued by the B. F. Goodrich Rubber Company, is a pocket size booklet telling the story of the gathering and manufacturing of rubber and rubber products—and is profusely illustrated with finished products of the company.

tured by The Lincoln Electric Company are described and illustrated in Catalog Section No. 3304, loose leaf type, published April 28, 1932; price list included in catalog.

Port of Seattle Yearbook for 1931 has been received and is a very beautifully illustrated volume, with green paper cover, and many full-page illustrations. The book contains an interesting history of the port and tells of its facilities and its extensive back country, furnishing a large variety of cargo for the port. The book illustrates, in addition, the great scenic beauties of the Puget Sound region which draw thousands of tourists every year.

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Trade Notes

Important Refrigeration Announcement.— Western Engineering Company of San Francisco, through George Swett, general manager, announces its appointment as distributors for the Carrier Engineering Corporation to serve the Northern California territory in the marine field, representing both the Carrier air conditioning equipment and Brunswick-Kroeschell refrigeration.

Sidney B. Carpender, vice-president of the Carrier Engineering Corporation of Newark, New Jersey, and L. H. Polderman, vice-president of the Carrier Engineering Corporation of California, of Los Angeles, were both in San Francisco recently in connection with the announcement of the sales and service appointment of Western Engineering Company.

Under the new arrangement, Western Engineering Company will carry a complete stock of repair parts, employing engineers and service men to take care of every requirement aboard ship.

Among outstanding Brunswick-Kroeschell refrigeration installations are the Dollar liners President Hoover and President Coolidge; the new Oceanic liners Mariposa, Monterey, and Lurline; the Panama-Pacific liners California, Virginia, and Pennsylvania; and the new Grace liners.

Carrier air conditioning is being applied to the dining saloon of the new Oceanic liners Mariposa, Monterey, and Lurline and to the public rooms of the two new express and passenger liners building at the yard of the New York Shipbuilding Company for the United States Lines' transatlantic service.

New Japanese Motorships.— Kokusai Line of Japan, for which Swayne & Hoyt, Inc., are Pacific Coast agents, have placed orders for two 19-knot, 7600 brake horsepower motorships for Japan-New York service. One is to be built by Harima dockyards and the other by



Uruga dockyards; both to be powered by Sulzer diesel engines.

Marine Sales.— Westinghouse Electric & Manufacturing Co. has announced appointment of Alf Herschel as marine sales service representative for the East Coast, headquarters Essington, Pennsylvania. He has been in company's service since 1916 and served as port engineer at Baltimore, Norfolk, and Philadelphia.

Radio Direction Finders.—Radio Corporation of America announces that four RCA radio direction finders are being installed on vessels of the Merchants and Miners' Transportation Co.; namely steamships Upshur, Somerset, Howard, and Juniata, all in coastwise service with ports of call between Boston and Jacksonville. This company now has ten vessels so equipped.

Grants "Preformed" Rights.— Macwhite Company has been granted license to manufacture preformed wire rope under the American

Cable Company's patents. Other companies in the United States licensed to make preformed wire rope are: American Steel & Wire, Broderick & Bascom Company, E. H. Edwards Company, Hazard Wire Rope Company, Pacific Wire Rope Company, General Cable Corporation, The Wire Rope Manufacturing & Equipment Company, and the Wickwire Spencer Steel Corp.

Metallic Packing.— The U. S. Metallic Packing Company manufactures a complete line of metallic packings both for reciprocating rods and for rotating shafts. This line includes the following types.

King Tandem Packing. This type is especially adapted to reciprocating rods such as the piston rods and valve stems of marine and stationary steam engines and the steam ends of piston rods of boiler feed pumps, circulating pumps, and general service pumps. It uses two sets of the famous patented King metallic packing ring. These rings are split on a diagonal and have a beveled outer surface. They are set up on the shaft by a ring wedge actuated by a spring. Properly installed, this packing is self-adjusting and will not cut, score, or heat the rod. It is practically vapor-tight. Anything passing the first ring will be stopped by the second ring.

King Unit Packing. This type works on the same principle as the King tandem type using only one King metallic packing ring.

Bradford Circulating Pump Packing. An ingenious arrangement of clamp, follower, Bradford metallic packing and vibrating cup all of which revolve with the shaft so that there is no wear on the packing at the point of seal. This type of packing is especially adapted to the rotating shafts of circulating pumps.

C.O.2 Metallic Packing. A double packing of soft metal rings with an oil seal between the inner and outer sets of rings and a soft packing gasket between the follower and the gland bushing. Steel bush rings separate the packing rings and a lantern bushing in the center separates the inner and outer sets of rings.

C. V. Lane of San Francisco has recently been appointed marine representative of the U. S. Metallic Packing Company for northern California.

Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER

Martin on Monterey.—As Pacific Coast marine representative for the Westinghouse Electric & Manufacturing Company, W. Edgar Martin was aboard the steamship Monterey, second of Matson-Oceanic liners making the maiden run from New York to her home port at San Francisco. "Eddie" Martin will supply us with first-hand facts on the power plant and electrical services.

East Bay Freight.—James H. Todd, Jr., assistant freight traffic manager of Sudden & Christenson, has been assigned to the East Bay territory, his jurisdiction, in addition to the East Bay cities of Oakland, Alameda, Berkeley, and Richmond, covering the Santa Clara, Sacramento, and San Joaquin valleys. Todd is well and favorably known in Pacific Coast shipping as well as to shippers and receivers of intercoastal cargoes.

New Californian Skipper.—Captain L. A. Carlyle has been assigned as master of the motorship Californian, flagship of the American-Hawaiian fleet of freighters. He succeeds to the berth occupied by the late Captain E. L. Smith. Captain Carlyle is a veteran of the company's service, having been in command of the Dakotan. His place on the Dakotan will be filled by Captain J. N. Hansen of the steamship Georgian.

Naval Assignment. Captain Henry E. Lackey, U.S.N., in charge of the San Francisco Hydrographic Office, and formerly in command of the U.S.S. California, has been appointed senior member of the Board of Inspection and Survey for the Twelfth Naval District, with headquarters at 100 Harrison Street, San Francisco. His place at the Hydrographic Office will be taken by Captain F. B. Freyer, who has been on duty at the War College.

Bilge Club Election.—At the annual election of the Board of Directors of the Bilge Club of San Pedro, Albert O. Pegg, superintendent engineer of the Union Oil Company of California, was named chairman.



The youngest commander in the Matson fleet is Captain Andrew G. Townsend of the San Francisco-Honolulu liner Maui.

He succeeds Harry J. Summers, principal surveyor of the American Bureau of Shipping at Los Angeles Harbor. Other members of the directors are Harry J. Summers, James Craig, William J. Maggio, E. R. Brucker, Steve Lindo, and Captain S. A. Kennedy.

The annual golf tournament of the Bilge Club will be held June 25 at Royal Palms. Upward of 100 are

expected to enter the play, and there will be indoor sports for those who do not follow the little white "pill."

Reunion. A group of men met recently at the San Pedro Chamber of Commerce and proposed to gather together for a reunion outing all of the shipyard gang which engaged in the war-time program of the Southwestern Shipyards at East San Pedro. This yard is now operated by Bethlehem Shipbuilding Corp.

The reunion is planned for June 12 at Point Fermin Park, San Pedro, and all the "gang"—buckers-up, shipfitters, riveters, and holders-on—are going to get together with their families (and basket lunches, of course) for a good time. Gene Mills, who used to be secretary of the Southwestern yard, is president of the reunion promoters; Frank Kemp is vice-president; A. L. Ferber, who used to be plant foreman, is another vice-president; Jesse Kopp is secretary. Among the originators of this unique gathering are Dr. Harold Bunkers, William Smith, George Aitkenhead, Fred Miller, William Lambie, Harry Shuster, F. Lamb, Jess Copp, and Frank Kemp.

New Manager.—B. E. Van Presley is the newly appointed general manager of the Alaska Steamship Company, with headquarters in Seattle. His appointment is announced following the resignation of H.C. Cantelow. Van Presley has been manager of the Kennecott Copper Corporation in Alaska, and announced the two companies are forming a consolidation.

Retires from N.Y.K.—Captain Shunji Ito of the motorship Tatsuta Maru, on a recent voyage to San Francisco, brought word that T. Asaka, well known in San Francisco as general passenger agent for five years for the N.Y.K. Line, has retired from the firm and is now manager of the Tokyo Golf Club. Asaka started his golfing career on the links around San Francisco Bay.



The former popular skipper of the Matson liner Manoa in the Honolulu service, Captain H. R. Gillespie, has been promoted to the position of chief officer on the new Oceanic liner Mariposa.



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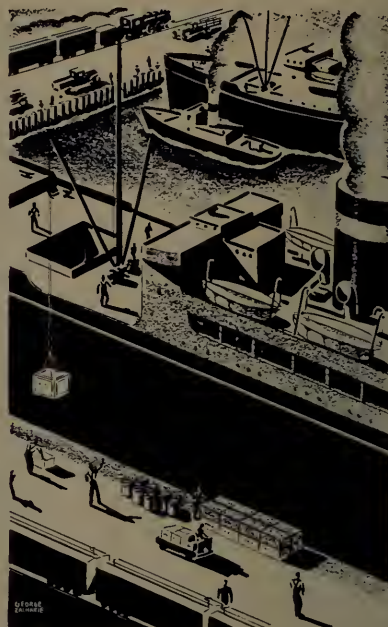
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Visitor.— Captain Thomas Blau was a recent visitor to San Francisco after an absence of ten years. He is now port captain of the Grace Steamship Company, and made the trip to California to confer with C. C. Mallory, vice-president of the Panama Mail Steamship Company, in preparation for the inauguration in service of the four new Panama Mail liners. Captain Blau, before joining the Grace Lines Staff, was manager in Hamburg for the United States Lines. His connection with San Francisco dated from the time he was master of the steamship Colombia operated in the transpacific service of the old Pacific Mail Steamship Company.

Tommy Imber.—Out at the Sydney dock where the Sonoma, Ventura and Sierra berthed for years, there's a familiar youngster, Tommy Imber by name—by talent, a boy master with crayon, ink, and brush. Tommy's twelve years young, and returning officers of the Oceanic Line have brought home to the Golden Gate examples of his remarkable talent for ship sketching.

Joseph R. Sume, junior third engineer of the Sonoma, met Tommy three years ago when the lad became a waterfront newsy to earn bread for his mother and brother. Ships and sketching were all Tommy talked and wanted to know, so Engineer Sume and his gang chipped in and bought the small maritime artist an outfit of paints and a drawing set.

When they made Sydney next voyage, Tommy was on dock, papers under one arm and a painting of the Mariposa ready for his Yankee friends. No detail of this modern carrier's symmetry had eluded Tommy Imber's eye and hand!

Seems now, though, the coming of the larger Oceanic liners means



The well known smile of Joseph R. Sume, junior third engineer of the steamship Sonoma. On his last trip to Sydney, Sume was presented with a painting of the Mariposa as she appeared on her maiden run to Sydney, by young Tommy Imber. A picture of Tommy and a reproduction of his painting are shown below.

new berthing spaces at Sydney, and Tommy Imber's friends will miss him, for a rival news vending out-



fit serves the new docking point.

If Tommy's friends want to reach him, though, with suggestions for a sketching job, he lives at No. 2 High Street, Sydney, Australia. His brush is a magic wand!

Docket Clerk.— According to an announcement by J. H. Rosseter, secretary manager of the Pacific Coastwise Conference, A. J. Hunsader has been appointed to the position of docket clerk, with offices at the San Francisco headquarters. Hunsader had been connected for six years with the Los Angeles Steamship Company at Los Angeles, in the traffic and claims departments, and is thoroughly familiar with this phase of the shipping business.

Skipper Named for Catalyst.—According to Dr. Thomas G. Thompson, director of the laboratories for the University of Washington, Seattle, Washington, Captain Carl M. Hansen has been chosen to command the University's new floating oceanographic laboratory ship, the Catalyst. The vessel is now under construction at the yard of the Lake Union Drydock & Machine Works, Seattle. Captain Hansen, for many years master of the Swenson Fur Trading Company's ship Nanuk, is thoroughly familiar with the waters in which this ocean-going laboratory will be employed.

Immigration Inspector.—According to announcement by Alfred E. Burnett, District Director of Immigration, William Brazie assumed his duties as inspector-in-charge of the San Pedro immigration station on May 1. Brazie was formerly on duty at Honolulu as assistant director. He succeeds Clarence G. Gately, who has been transferred to San Diego.





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Atlantic - Far East

WEEKLY SAILINGS from New York. FORTNIGHTLY from Boston to Honolulu, Yokohama, Kobe, Shanghai, Hongkong, and Manila. FORTNIGHTLY SAILINGS from Manila, Hongkong, Shanghai, Kobe, Yokohama, Honolulu to New York and Boston.
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Chamber of Commerce from 4 p.m. to 9 a.m. and on Sundays and Holidays: DAV. 5000.

And Lay Still

When on Station under Sail a White Light is carried at Mast Head. When under Power, a Red one under White; a Flare or Torch is also burned frequently.

Gatley enjoyed the record of unbroken duty at the port immigration station at San Pedro since February 1914, and is credited with having developed the establishment to its present scope, employing twenty-seven persons.

Commands Flagship.—Captain L. D. Douglas has been appointed to the command of the Canadian Pacific liner *Empress of Japan*, flagship of the company's transpacific fleet, according to word received from Vancouver. The captain was formerly skipper of the transpacific liner *Empress of Asia*. The latter vessel will now be under the command of Captain A. V. R. Lovegrove, D.S.O., who has been in the service of the Canadian Pacific since 1910.

Executive Resigns. Resignation of Frederick Toppin as a vice-president of the International Mercantile Marine Company was announced last month by P. A. S. Franklin, president of the company, according to telegraphic advices received at San Francisco by L. E. Archer, passenger traffic manager for the Pacific Coast. Toppin's resignation, effective June 1, severs a connection of nearly half a century of service with the White Star Line and International Mercantile Marine Company. In recent years he has been specially identified with the operation of the White Star Line's New York service.

He has been active in the shipping life of New York, having for fifteen years headed a committee, representing various transatlantic lines, handling negotiations with the International Longshoremen's Union. He was also a member of the managing committee of the North Atlantic Passenger Conference.

Freight Agent. Lloyd R. Richards has been appointed general freight agent for the Los Angeles Steamship Company in charge of inter-coastal solicitation, according to an announcement by J. T. Kennedy, freight traffic manager. The LASSCO is agent at Los Angeles for the Arrow Line. Mr. Richards has served as freight solicitor for Inter-coastal, Hawaiian, and Coastwise services.

Naval Reserve. On her arrival at Los Angeles Harbor from her first round-the-Pacific tour, the Steam-



They say that the Oakland Harbor Pilots Association represents more than a century of marine experience, although the association has been organized only a few months. Above are shown the four members of the pilot board, each of whom has had more than twenty-five years' experience as master and pilot. They are: Captain E. H. Croeper, Captain G. Maudsley, Captain E. Johnson, and Captain G. H. Brokaw.

ship *Mariposa* will be inducted into the U. S. Naval Reserve, according to an announcement by Rear Admiral Thomas J. Senn, commandant of the Eleventh Naval District.

The ceremonies will be under the supervision of Lieutenant-Commander James A. Cruitchfield. Captain Alonzo H. Woodbine, reserve chief, will present the Naval Reserve Flag to Commodore J. H. Trask, commander of the *Mariposa*.

Rear Admiral Senn announced at the same time that Captain Ernest Rutul, master of the Ritchfield tanker *Pat Doheny* has been appointed a lieutenant-commander in the Merchant Marine Naval Reserve.

Yacht Skipper. Captain W. B. Studley is now the skipper of W. J. Hole's fine new steel cruiser yacht *Samona II*. Captain Studley's appointment followed Mr. Hole's return from a cruise up the Amazon River and around South America, on which trip the former served as mate. He is a graduate of the Massachusetts State Nautical School and was first officer on Panama Pacific line ships.

Samona II was built last year for Mr. Hole by the Craig Shipbuilding Company at Long Beach, Calif. She is 147 ft. long, and attains a speed of 14 knots. She is especially built and equipped for fishing, hunting, and exploration trips.

Port Manager. Arthur H. Abel has been appointed manager and chief engineer of the Port of Oakland, according to an announcement by Ralph T. Fisher, president of the Board of Port Commissioners for Oakland, California. This appointment follows the resignation of George B. Hegardt, who submitted his resignation effective May 15, stating that after forty years of

work throughout this country on public projects, he wished relief from his heavy burdens.

To Mr. Hegardt was assigned the task in 1926 of carrying out the building program instigated by the Board of Port Commissioners in Oakland, and too much credit cannot be given him in this work. Oakland in this short space of time has taken its place among the leading ports of the Pacific Coast and is on a fair way to be one of our leading world ports.

Hegardt was born in Minnesota and was graduated from several technical and engineering colleges. His professional work brought him under the U. S. Army Engineering Corps and he took part in the building of breakwaters at Chicago and had charge of construction of locks and dams in the Illinois River. Coming to the Coast, he built the Cascade locks on the Columbia River, and the jetties and the fortifications at the mouth of the river. He became manager and port engineer at Portland, Oregon, and the present high grade of port facilities there are a monument to his ability as a designer and executive. Hegardt shall probably continue to serve the Oakland Port project in an advisory capacity.

As his assistant at Oakland in his work Mr. Hegardt brought with him from Portland Arthur H. Abel, who had served as his assistant at Portland for thirteen years. He previously served with the Northern Pacific and Great Northern Railways. He should be a very worthy successor to Mr. Hegardt in bringing this port project to a successful completion.



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MERRY month of May sees six new members signed on for action in future affairs of the Propeller Club of California. This addition to our roster, hot off Stanley Allen's newsmill, bids us fall in to welcome New Members James G. Bulloch, Dr. E. M. Parlett, Charles Hopkins, Herman D. Nichols, Captain A. H. DeGuire, Captain H. W. Rhodes, and E. J. Macfarlane.

— PC —

A rollicking band broke all attendance records in turning out for the Spring Frolic staged at the Commercial Club, Wednesday evening, May 18.

The entertainment committee staged a fast-moving "something-doing-every-minute" Fanchon & Marco Propeller Club Revue, with 22 acts presented for the anatomical and musical edification of an enthusiastic audience. From the opening strains of symphonic jazz, which greeted the diners upon their entrance, to the mightily colorful and decorative banquet hall until the "all hands on deck" finale there wasn't a dull moment.

Again commendation is due the efficient work of the several committees whose separate functions worked harmoniously in gear under the guiding hand of President Jim Cronin and Captain Tom Hunter—Tom Forster handled the reservations smoothly and everyone was adequately cared for.—Kenneth Ingraham supervised the preparation of the menu and et ceteras with rare good judgment.—Jerry Lalor's decorative scheme with flags of all nations and international code provided the proper background.—H. J. "Bert" Anderson headed the entertainment committee whose work in building the swelegant

program sets a new high mark. Ben Hedstrom's naval architectural experience was reflected in his mammoth table arrangement.

A feature of the evening was President James Cronin's address of welcome to the distinguished guests from the Port of Latavia. Jim's well-chosen remarks commanded the eager attention of all present.

H. Gerrish Smith, president of the National Council of Shipbuilders was our distinguished guest.

When do we have the next jinks?

— PC —

Propeller golf committeemen are under way with plans and program for the important Fall Golfing Championship, to be convened at some beautiful spot in northern California when the summer vacation days are over. Propeller fairway frolics, spring and fall, now an established and commendable custom, have achieved acclaim and applause from every point of the compass.

— PC —

May luncheon gatherings, held on Tuesdays in the California room of the Commercial Club in the Merchants Exchange in San Francisco, were a series of unusually well attended sessions. Notable and capable speakers presented a range of timely topics, appropriately chosen and comprehensively presented.

May 3.— Guest speaker: Wesley O. Ash. Subject: Commerce and Trade. Mr. Ash is manager of the San Francisco office of the Bureau of Foreign and Domestic Commerce and gave a very interesting talk.

May 10.— Guest speaker: Dr. Louis Patmont. Subject: "Is there a Red Menace?" Dr. Patmont is a world traveller and master of many

languages. He has lived in Russia for many years and in his talk vividly portrayed actual conditions existing in Russia.

May 17.— Guest speaker: H. Gerrish Smith. Subject: Ship Construction and Operation. Mr. Smith is president of the National Council of American Shipbuilders, vice-president of Bethlehem Shipbuilding Corp., Ltd., and a former naval constructor at the Brooklyn Navy Yard. He portrayed during his address a very comprehensive picture of present and future shipbuilding and vessel operation conditions.

May 24.— Guest speaker: Captain Charlie Boster of the tug Standard No. 1. Captain Boster has been connected with towboat activities on San Francisco Bay for many years. He gave a very interesting account of the early days' custom of laying off the Farallons in wait for the famous clipper ships of which there were a great many in those days.

May 31.— Guest speaker: Ellis L. Manning, scientific expert of the Research Department of General Electric at Schenectady. Subject: Research—Industry's Most Important Raw Material. Mr. Manning is on the West Coast to appear in Los Angeles in June, addressing the National Electric Light Association convention.





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S. S. President Coolidge and S. S. President McKinley in the two graving docks at the Hunter's Point Works of Union Plant. The dock at the left is the largest commercial graving dock in the United States.

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Quips That Pass in the Night

Housewife: "Don't bring me any more of that horrid milk. It is positive blue."

Milkman: "It ain't our fault, lady. It's these long, dull evenings that makes the cows depressed."

That Settled It

Mr. Richman: How do you like this place? Shall we buy it?

His Wife: Oh, it's perfectly lovely! The view from this balcony is so fine that it leaves me speechless!

Mr. Richman: Then we'll buy it.

Q.—What is the Scotch football yell, Mr. Sinclair?

A.—We want our quarterback.

Lady (at phone)—"Come up to my room at once—there's a man under my bed!"

Hotel Clerk—"Say, what th' heck do you want for two bucks?"

Small Brother: "Say, sis, can I hang up one of your stockings Christmas?"

Big Sister: "What on earth do you want to hang up one of mine for?"

Small Brother: "So's I can see what's in it without getting out of bed."

Just a Couple of Pals

The newlyweds were on their honeymoon. They had the drawing room and the groom gave the porter a dollar not to tell anybody on the train they were married. When the happy couple went in for breakfast next morning all the passengers snickered.

The groom called the porter and demanded: "Did you tell anybody on the train we were just married?"

"No sir," said the porter. "I told 'em you all was just good friends."

Billows Were Rolling High

The assessor sent his assistant to appraise the furniture in a home nearby. When, after an absence of nearly three hours, the assistant failed to return his superior went to look for him. He found him asleep on the davenport. By his side lay a partially filled report.

It started out fine: "One davenport, one piano, one dining room suite, one full bottle of whiskey." Here the report stopped. The "full" had been scratched out and above it was written "half." This, in turn had been blacked out and the word "empty" inserted.

At the bottom, apparently written in a last frenzied effort at duty, there appeared in wobbly handwriting: "One revolving rug."

A sweet young girl—"I just adore dark men."

Motorman Slahy—"You'd have a big time in Africa."

More "WE" Stuff

A flea and an elephant walked side by side over a little bridge. Said the flea to the elephant, after they had crossed it: "Boy, we sure did shake that thing!"

Clerk in Farrington's: "You can have anything in here for a dime."

Swede Erickson: "Fine, I'll take that little blonde over there."

Diner (in restaurant, after waiting 15 minutes for soup): "Waiter, have you ever been to the Zoo?"

Waiter: "No, sir."

Diner: "Well, you ought to go. You'd enjoy watching the tortoises whiz past."

Traffic Officer (stopping car with lady at the wheel): Say, where's the fire?

Lady Driver: In your eyes, you great big gorgeous patrolman.

(From Lowell, N. M., Press)

East End—Comfortable room for one or two gents steam heated maid furnished without extra charge.

Come By Honestly

Teacher (helping child fasten coat): "Did your mother hook this coat for you?"

Child: "No, ma'am. She bought it."

The first time a Scotchman used free air at a filling station, he blew out four tires.

A childless couple adopted a three month old French orphan. Then they took a correspondence course in French so they would be able to understand the baby when it started to talk.

"Harry surprised me by telling me we were going to take our honeymoon in France."

"How nice; and how did he spring it on you?"

"He said as soon as we were married he would show me where he was wounded in the war."

100 Per Cent. Correct

Teacher: "Tommy, is trousers singular or plural?"

Tommy (after much thought): "Singular at the top and plural at the bottom."

A Tale of Two Patches

A woman advertised for a man to work in her garden. Two men applied for the job. While she was interviewing them she noticed that her mother was making signs to her to choose the smaller. When the women were alone the daughter said: "Why did you signal me to choose the little man, mother? The other had a much better face."

"Face" exclaimed the other. "When you pick a man to work in your garden you want to go by his trousers. If they're patched on the knees, you want him; if they're patched on the seat, you don't."

Leaving It To Fate

The Smiths are on the balcony and can hear what a young couple are saying in the garden below.

Mrs. Smith: "I think he is going to propose to her. We ought not to listen. Whistle to him."

Mr. Smith: "Why should I? Nobody whistled to warn me."

Justice: "How did the accident happen?"

Stremic: "Why, I dimmed my lights and was hugging a curve."

Justice: "Yeah, that's how most accidents happen."

The high heel was thought of by a woman who was kissed on the forehead.

A traveling salesman from Glasgow was standing in a Belfast street watching the sights, when a band came around the corner, playing for dear life. The day was hot. The handsmen had their coats off. Having no one to talk to, the man from Glasgow stepped up to an Irishman and said, with a smile: "I see they have their coats off to play the band here?" "Begorry, and that's nothing," said the Irishman; "when I was in Scotland I noticed that they had to take their pants off to play the bagpipes."

Some Difference

The old gentleman did not try to help his wife into their new car as he used to in the horse and buggy days.

"You're not so gallant as when I was a gal," she told him.

"No," he replied, "and you are not so buoyant as when I was a boy."

"How do you like me in my new gown? I got it for a ridiculous price."

"You mean you got it for an absurd figure."

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JULY, 1932

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SAN PEDRO, CALIFORNIA

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXIX

JULY, 1932

NUMBER 7

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Official Organ
Pacific American
Steamship Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-President and Manager

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Member of Pacific Traffic Association

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Chas. F. A. Mann, Northwestern Representative, 1110 Puget Sound Bank Bldg., Tacoma, Washington

Official Organ
Shipowners' Association
of the Pacific Coast

Alexander J. Dickie,
Editor.

Paul Faulkner,
Advertising Manager



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THESE TWO CHARMING INTERIORS DEPICT THE FORWARD AND AFTER BULKHEADS OF THE LOUNGE. THEY ILLUSTRATE WHAT MIGHT BE TERMED THE MODERN AMERICAN STYLE IN MARINE INTERIORS. THE DESIGN, CONSTRUCTION, AND ERECTION OF THE INTERIOR DECORATIONS ON THIS VESSEL ARE THE WORK OF THE FORE RIVER PLANT OF THE BETHLEHEM SHIPBUILDING CORPORATION.

Pacific Marine Review

VOLUME XXIX

JULY, 1932

NUMBER 7

Diesel Ferry Chippewa

Interesting Conversion Achieving 25 Per Cent. Increase in Speed, 65 Per Cent. Reduction in Fuel Consumption, and Other Savings

By A. A. Tacchella

NEW standards of ferry service both as to speed and accommodations were introduced to the public by the Puget Sound Navigation Company with the re-entering into service of its automobile and passenger ferry Chippewa.

Early in February the steamship Chippewa was taken off her run (Seattle-Bremerton), and in two and a half months was back as the motorship Chippewa, with new luxurious passenger accommodations and an entirely new power plant, having been converted from steam to diesel with a 50 per cent. increase in power.

The extremely short time in which this conversion was made must be of great interest to ship operators contemplating modernization of boats. The work for this boat was carried out at the Lake Washington Shipyards under the supervision of James E. Murphy, marine superintendent of the Puget Sound Navigation Company. Plans for all work had been laid out by H. W. Schmitz, the operating company's naval architect. This job has clearly shown how economies in remodeling can be effected by thorough preparation of plans and a well directed efficient organization. It may be mentioned that ten days after lowering the crankshaft of the main engine into the boat the power plant was started for the first time.

Captain Alexander Peabody, forceful president of the Puget Sound Navigation Company, is to be congratulated for his work. Building now with vision for future requirements is the problem of the leader of today, and Captain Peabody has shown in the remodeling of this ferry that standards of service both for speed and accommodations can be increased and at the same time operating economies can be effected by careful planning of schedules and proper selection of equipment.

In this case an increase in the vessel's speed from 13 to 16½ knots has been effected, with a reduction in fuel consumption for all purposes from 10 barrels per hour to 3½ barrels per hour, or, with 14 hours of running time per day, a saving of from 90 to 95 barrels of fuel per day. In addition to this, Mr. Murphy states that five men in the engine room crew are saved by the new installation as well as \$6 per hour on fuel bills for every hour the vessel operates.

To increase the speed of a vessel from 13 to 16½ knots and yet effect such savings in the operation of her power plant is of course very important, but after all these are only items affecting the single unit. The



Mrs. Charles Peabody, widow of the founder of the Puget Sound Navigation Company and mother of its president, receiving congratulations on the ferry Chippewa.

operator must think further than that; he must take the operation of a fleet into consideration. With the speeding up of certain units in a fleet the frequency of sailings can be increased, and this in turn may make it possible to eliminate a unit; or, in other words, where three slower boats were required to keep a certain frequency of service this can now be done with two boats.

But there is more to be considered. While new standards in service have been introduced with the modernization of this vessel, a new type of engine has made this possible. As the development of the airplane is dependent upon the perfection of the high speed gasoline engine, so is modernization of vessels dependent upon available types of power plant equipment. Only a few years ago the available types of diesel engines were far too heavy for such a conversion, not to speak of their cost and the cost of conversion.

Here it was up to the engine builder to see into the future and, as the late Adolphus Busch pioneered the diesel engine in this country, so credit must again be given to the organization he originally created for this important and far-reaching development. The Busch-Sulzer Bros. Diesel Engine Co., under the energetic leadership of its president, E. B. Pollister, has produced a new type of engine which is bound to become a big factor in the development of a highly economical commercial fleet, either by conversion and modernization of existing units or by new tonnage.

This new engine development is of equal importance to the navy as it is to the merchant marine. Such has already been recognized in the visit of engineer representatives of at least one foreign nation who have made a close study of this power plant.

The general arrangement of the machinery is shown in the accompanying engine room layout. The main unit is a direct-reversible, 8-cylinder, solid-injection, Busch-Sulzer, 2 cycle engine, type DHMT, developing

2130 brake horsepower at 210 revolutions per minute. This engine has been fully described in our issues of December 1931 and May 1932.

The auxiliary engine is a 5-cylinder, 4-cycle, air-injection unit of 375 brake horsepower, 360 revolutions per minute, direct-connected to a 3-phase, 60-cycle, 440-volt General Electric, alternating-current generator. This unit furnishes power for all engine room auxiliaries, such as turbo-blower, the various pumps, manoeuvring air compressors, and the lights.

The Puget Sound Navigation Company operates several other motor vessels, and considerable valuable experience gained from their operation has been incorporated by Mr. Murphy into this new installation. Engine cooling received first consideration. The water temperature in Puget Sound ranges between 45 degrees Fahrenheit to a maximum of 55 degrees Fahrenheit. This is rather low, and has many disadvantages for operation in this service particularly. For this reason fresh water cooling for both the main and auxiliary engine has been adopted and has already proved itself to be of great benefit. When starting in the morning the warm water from the auxiliary engine is circulated through the main engine for warming up. This facilitates starting and manoeuvring, but even of more importance is the benefit of the gradual warming up of the main engine before starting, and the fact that it can be kept warm during the necessary stops in ferry slips.

The heat exchanger for the cooling of the fresh circulating water was built by the Alaskan Copper Works under the personal supervision of Robert C. McCloud. This firm also furnished the oil cooler and installed the

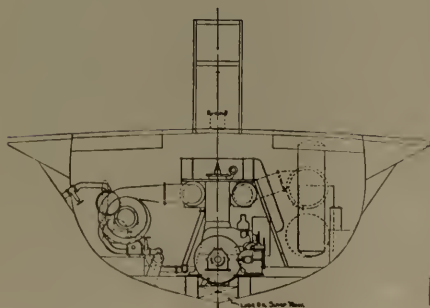
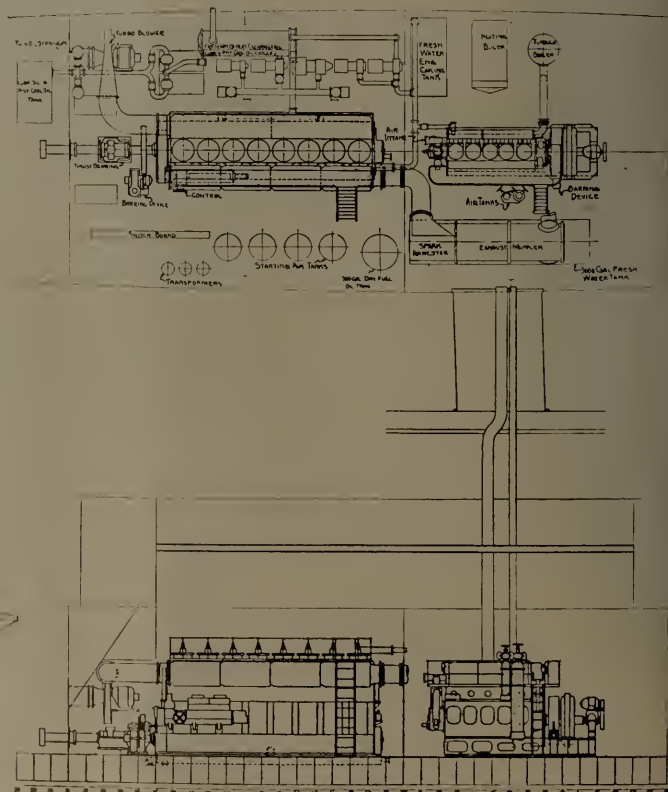
copper pipe job connected with this equipment, as shown in illustration.

Since the pistons are oil-cooled, considerable amount of sump tank capacity is provided. Conditions did not permit sufficient sump tank capacity below and aft of the engine bedplate, and for this reason a special tank was provided aft of after engine room bulkhead. The lubricating oil is pumped from the small sump tank aft and below the engine bedplate to this special tank for deaeration and settling. Then it is pumped through the salt water cooled oil cooler, with by-pass arrangement for regulation of temperature, to pistons and bearings. A De Laval centrifugal oil purifier is provided in this system.

Scavenging air is provided by a General-Electric turbo-blower. Silencing of the suction to this blower has been ingeniously accomplished by making use of the six-foot space between the level of the old main deck used when the Chippewa was a packet, and the new ferry deck. Aft of the main engine room, slots are cut in the floor of this space, around each stanchion. The entire engine room is thus ventilated by air drawn aft into the shaft alley and up through these slots into the blower. Vents are placed above the automobile level on ferry deck, with enough space for intake so as to make the air intake practically silent.

The exhaust from the main engine is first led into a spark arrester, designed by the engine company but built in Seattle, and then into a muffler and up the stack. This arrangement provided an extremely satisfactory silencing of the main engine exhaust as well as avoidance of any sparking. The exhaust from the auxiliary engine is carried to a locally built waste heat

General arrangement plan of the machinery lay-out on the diesel ferry Chippewa. Note that the main propulsion unit, developing 2130 brake horsepower, requires but little more headroom than the standard type 375 brake horsepower diesel of the same make driving the auxiliary generator. It was this feature of the new type Busch-Sulzer diesel that made this conversion possible.



boiler. This waste heat boiler, together with an automatically fired auxiliary boiler, supplies steam to steering gear and whistle as also for heating of all cabins. Practically all pumps for this installation were furnished by the De Laval Pacific Company. The switchboard is of the deadfront type, as shown in illustration, and was furnished by the Westinghouse Electric and Manufacturing Company.

The total fuel consumption for all purposes (that is, the main engine, the auxiliary engine, the auxiliary oil fired heating boiler, and the galley range) figured out

to be 0.54 pound per main engine shaft horsepower hour. Consideration must be given to the fact that the auxiliary load above that required for the blower is relatively large, with the oil and water system pumps, five Frigidaire cabinets, lights, and fans for the unit heating system. The galley range is oil-fired and is in continuous service, as meals are served at all hours. Considering this, the total fuel consumption is remarkably low.

In other respects this installation is like other diesel jobs, but visitors to the Northwest should not fail to visit this boat and inspect this extremely simple type of main engine, together with the excellent passenger accommodations.

Telegraph Centennial

THIS year, the nation will be celebrating the Centennial of the birth of the telegraphic idea in the brain of Samuel F. B. Morse. This idea and its genesis had profound significance for merchant marine operation.

Morse, a distinguished American artist, was returning from a trip to Europe in the fall of 1832 on the sailing ship *Sully*. On October 1, of that year, thinking of the uncertainties of life in general and of sea voyages in particular, he was suddenly seized by an inspiration. Why not use electricity for transmitting messages? During the balance of the long, slow westward passage, this idea took firm root and the basic features of the electric telegraph were worked out.

Morse struggled along with his idea. In 1835 he was appointed Professor of the Literature of the Arts of Design at New York University. There, in his rooms on Washington Square, he built his first telegraphic recorder arranged on a picture frame with a lead pencil on a pendulum to mark dots and dashes. On January 24, 1834, he transmitted at a public demonstration the historic first sentence by telegraph: "Attention Universe! By Kingdoms Right Wheel." In 1838 he held a demonstration at Philadelphia and before the President at Washington. He then began a campaign to have Congress appropriate \$30,000 to build a 40-mile telegraphic line from Washington to Baltimore. For five years he struggled against political ignorance, receiving only ridicule and abuse. Finally almost midnight on the closing day of Congress, March 3, 1843, his bill was passed and the first telegraph line was soon in operation.

Union-Oceanic Lines (Correction)

In an editorial entitled "Oceanic Steamship Company," which appeared on Page 210 of the June issue of *Pacific Marine Review*, the wording of the fourth paragraph would seem to indicate that the former operation of the transpacific service jointly by the Oceanic Steamship Company and the Union Steamship Company of New Zealand was terminated through dissatisfaction of one or both parties.

On the contrary, we are informed that such is not the case, and that the only reason for the dissolution of this operating agreement was the fact that when the United States Government took over the Hawaiian Islands, the coastwise shipping laws of the United States were applied to this territory. For this reason it was ruled that the foreign line could not operate jointly with the American vessels in the commerce of the Islands.



Three views in the engine room of the diesel ferryboat *Chippewa*, showing (at top) the control stand of the Busch-Sulzer main propulsion engine; (center) the switchboard for control of auxiliary power and lighting circuits built by the Westinghouse Electric & Manufacturing Company; and (bottom) the coolers for lubricating oil and for engine cooling water built by the Alaskan Copper Works of Seattle.

Reconditioning U.S. Army Transport U. S. Grant

*Electric Arc Welding Demonstrates its Usefulness in
Producing Dependable Structural and Repair
Job in Record Time*



An arc welder at work on the U. S. Grant.

A VERY creditable performance record was made by the General Engineering & Dry Dock Company when the United States Army transport U. S. Grant was delivered to the Transport Docks, San Francisco, on June 2 with the reconditioning and repair contract 99 per cent. complete and with four days left to finish up the odds and ends out of the allotted 34 working days time on this job.

During the thirty working days that the transport was in the hands of the General Engineering & Dry Dock Company she was changed in many ways; so that she now has a flush deck forward, a complete new well deck aft, squad rooms giving comfortable accommodations for 582 troops, a nice group of suites with private bath for first class passengers, complete new heating, ventilating, lighting, and hot water circulating systems for these new accommodations, and considerable reconditioning of machinery.

Practically all new structural work and changes in old structural work were carried out by electric welding. This welding was all done by Brown Bros. Welding Co., of San Francisco. The job is of particular interest because it proves that even though our shipyards on the Pacific Coast have been suffering very severely from lack of contracts, the ability and the energy to push through a large contract of this kind are still here, and San Francisco Bay may still claim first place among American ports in the facilities and the abilities that make for prompt and efficient service in the repair and reconditioning of ocean-going vessels.

Army transport U. S. Grant was formerly the German passenger vessel *Konig Wilhelm II*, built in Stettin in 1907. She has twin screws driven by quadruple



Welders and ship fitters at work on the partially completed enclosure of the well deck forward.



View on the flush deck forward showing the completed job of the enclosure of the former well deck.

Troop Squad Rooms



Two views showing the lower ends of the frames of the new shell plating in the forward well deck enclosure, illustrating the details of forming the brackets by welding.

expansion engines, taking steam from oil-burning boilers fired by Ray oil burners. Her machinery installation had a complete overhaul a few years back at the Mare Island Navy Yard and has been functioning very satisfactorily.

She has the following characteristics:

Length over-all	508 feet
Length between perpendiculars	490.4 feet
Beam	55.3 feet
Depth	27.6 feet
Gross tonnage	9410
Net tonnage	5764

Prior to the recent acquisition of the Republic, the C. S. Grant was the largest transport operated by the United States Army and she is still the largest using San Francisco as a home port.

Two objectives were aimed at in this reconditioning of the ship: first, to increase the comfort of troop quarters; second, to provide a small number of first class modern suites.

The first objective was obtained by: Subdividing the troop quarters into squad rooms containing standee berths for from eight to sixteen persons; providing better lighting and ventilating facilities; and providing more adequate heating. The second objective led to replacement of nine first class staterooms on A Deck by a group of four suites with bath. Circulation of hot fresh water was installed in connection with passenger accommodations.

Well Deck Forward

Enclosing the well forward meant the removal and installation of deck winches, cargo gear, steam piping, fire piping and hydrants, anchor stowage, standing rigging, a Rich smoke detection cabinet, fair leads, davit sockets, rails, watertight doors, hatch coamings, hatch strong backs and sockets, bitts, and bollards. In fact, the government specifications require nearly five large pages of single-space typewritten instructions to enumerate the items affected by this change, all of which must be removed carefully and most of which must be reinstalled on the upper level after the well has been enclosed. Our illustrations show this operation under way and finished.

Bulkheads to subdivide the 'tween deck spaces into squad rooms were of No. 12 gauge "Red Hard" steel, stiffened with 1x1x1 8 inch steel angles and with 2x1 1/2 x 1 8-inch steel angles forming the door frames. All stiffeners are connected to the bulkhead with tack welds, spaced 3-inch centers. Edges of bulkhead plates are joined with a light, continuous weld and are connected to the back of the stiffener covering the seam by a light continuous weld. At top and bottom, the bulkhead plating is continuously welded to angles. The bottom angles are connected by welding to the deck, and the top angles are welded to underside of deck plating and to bottom of beams. The spaces between deck beams in longitudinal bulkheads are filled with expanded metal louvers. In the arrangements of these troop-squad compartments, provision was made for blower rooms to house the six Buffalo Forge turbocanoidal fans and their Westinghouse motors and controls. Wiring for these motors and for adequate electric lighting for all compartments was installed in U.S. Navy armored cable, according to U.S. Navy specifications. Carefully figured ventilating ducts and branches were erected and connected to give adequate fresh air to each squad room. Heating radiators and the insulated steam piping thereto were relocated to suit the rearrangement of berths and new radiators and piping were installed in the new troop spaces.

Refrigerating pipes and coils were entirely rearranged, and an operator's room, with valves and manifolds for complete central control of the brine circulation was installed aft.

In connection with the troop squad rooms installation, it was necessary to rearrange and or relocate troops library, troops barber shop, troops baggage room, troops linen room, and waiters' quarters. All of these various compartments were fitted with doors, hardware, light fixtures, switches, furniture, standee berths, and other equipment necessary for the adequate functioning in the designed uses. Electric light fixtures are by Westinghouse, hardware by Getty, standee berths and mattresses by Simmons, and all new steam heating radiators by the United States Radiator Corporation.



Two views showing troop passageways under construction and completed.



Extension on commanding officer's room, showing plate work under construction and the finished job.

Upon completion of the alterations and before installation of hardware fixtures and furniture, all new and old steel work was thoroughly cleaned, and where necessary it was chipped and sealed to the bright metal, and then painted with one coat of red lead, one coat of flat white, and one coat of white enamel.

Changes in First Class A Deck

In the first class accommodations, nine staterooms on A Deck were changed into a group of four de luxe suites, one 3-room, two 2-room, and one single room, each with its private bath; a reception vestibule was added to the commanding officer's room; and the bath and toilet accommodations on A Deck were rearranged and enlarged. Brass chromium plated fixtures of special design were furnished for the staterooms by the Marine Electric Co.

The suites are arranged with welded steel bulkheads, masked by panels of plywood furnished by the Davis Hardwood Company of San Francisco. This plywood was accepted by the Army Transport Service only after exhaustive tests had proved that the adhesive qualities of its binding glue were independent of exposure to salt water. Solid mahogany trim is used. All hardware is white bronze, satin finish, furnished by Getty. Beds in these rooms are Simmons, furnished with the famous Simmons Beautyrest mattresses. Furniture was supplied by Sloane of San Francisco.

An interesting feature, and one that adds greatly to the comfort of these rooms, is the special cork flooring laid on the steel deck to furnish an elastic sound and heat insulating base under the carpets. This flooring was furnished and installed by the Van Fleet-Freear Company of San Francisco. It is finished with a 2-inch wide teak strip round the edges of the rooms, to which the carpet is fastened by snap grommets. The carpets are deep pile velvet Wiltons in appropriate colors and patterns, furnished by Anderson's of Oakland, California.

Bathrooms in connection with these suites are floored with ceramic tile and are fitted with Crane 5-foot enameled corner bath equipped with shower, shower curtain, and all necessary fittings in chromium plate finish. The ground of floor tiling is white with a one-tile border insert of color. Lighting fixtures in these bathrooms are of Lenox porcelain.

This reconstruction and alterations in the first class quarters entailed a considerable shifting and renewing of steam piping, steam radiators, exhaust piping, water piping, electric wiring, ventilating ducts, and sanitary drains.

Coordination and Cooperation

The expert ship fitters of the General Engineering & Dry Dock Company cleared the compartments and

laid out the work ready for the welders. Time being one of the main features in this contract, the Brown Bros. Welding Co., subcontractors for the welding operations, moved onto the ship twenty electric arc welding machines and arranged to have 60 welders working in two shifts part of the time and in three shifts the rest of the time. Between four and five tons of electrode were used on the job and over six miles (between 32,000 and 33,000 feet) of seam were welded. The General Engineering organization kept the material and power coming as needed, and by intelligent coordination and cooperation the work was rushed through in record-breaking time.

The South American California

BETWEEN the sub-tropical country in the north of Chile and the cold regions of the south, lies a vast expanse of territory that if it were picked up and dropped on California would seem their very own homeland to the native sons of the West. This territory is not only like California in climate and many physical characteristics, but it is also similar in products. More and more the people of Chile are wondering if their destiny is not agricultural rather than mining. With the decline in the natural nitrate market, the chaos that exists in copper and the languishing coal trade, steadily the drift is to agriculture, and the government is doing its utmost to encourage the trend. Particularly is fruit and nut culture looked upon with high favor.

Chile has made very satisfactory progress indeed with her export fruit business. Chilean fruit is popular abroad, the business is being well managed and the government is doing its part. Since 1928 the state has appropriated 10,000,000 pesos annually for the development of the industry. The Department of Agriculture has a special section that gives careful study to fruit culture; the Ministry of Foreign Affairs has compiled exhaustive information regarding foreign markets; the Export Law guarantees that the fruit shall be as represented and of the highest excellence; consuls and commercial representatives are doing all they can to expand exports; and experts have been sent to California, South Africa, Australia, New Zealand, and many other countries for the purpose of carefully investigating fruit varieties and methods of cultivation.

In order to balance the budget the government is now urging a maximum production of agricultural commodities. Credits will be provided farmers, and various government departments will co-operate with foreign and domestic market information.

Our Overseas Shipping

Frank Statement of Some of its Present Problems and a Suggestion as to the Way Out

*By Roger D. Lapham**

ADMITTEDLY, our export and import trade is suffering today from lack of volume. We do not have to quote many figures to prove this. We know that the total value of our imports and exports declined from \$9,640,358,000 in 1929 to \$4,513,561,000 in 1931. These figures are for the fiscal year ending June 30, and it is pretty certain that the fiscal year ending June 30, 1932, will show an even greater decline than the year previous.

I do not pretend to be an expert in world economics, but it seems perfectly obvious to me that the American shipowner in foreign trade cannot expect to secure full cargoes for his ship unless it is made more possible for the American exporter to send his goods abroad, and more possible for the exporter abroad to sell his goods here. Under existing circumstances, size, newness, and speed of vessels, or frequency of sailings, mean little or nothing in the general picture.

Ocean freight rates are low enough; yet, low as they are, it is the lack of volume that hurts most. Some shipping lines in foreign trade whose ships were purchased from the Shipping Board and are being operated by private owners with mail contracts awarded under the Shipping Act of 1928, are now losing money; and remember, this is with mail pay! Some of these lines which have constructed new ships and borrowed three-fourths of the construction cost from the Shipping Board at extremely low rates of interest are being hard put to meet the interest requirements, let alone the payment of maturities.

I have no wish to offend or discomfit the American shipbuilder. The country needs him, and it is too bad that Congress has seen fit, during the last ten years, to develop and use their costly Navy Yards at the expense of the private shipbuilder. Yet the fact remains that the last thing the American shipowner in foreign trade wants today is new ships. While new and fast ships have many traffic advantages, the truth of the matter is that it is the cheap and slow ones that fix the freight rates, so the margin of loss for a new ship under today's conditions is much greater than it is for the older and cheaper vessels.

All this is leading up to what can be done to stimulate and revive our overseas trade.

It seems to me that the United States, during the years since the war, has deliberately, although perhaps unwittingly, fostered the development of the situation we are now facing. We loaned our allies moneys to finish the war, and for a year or so afterward furnished supplies and foodstuffs not only to them but also to the beaten nations. These supplies and foodstuffs were furnished at going prices, which Heaven knows were high enough, and instead of cash we took promises to pay. That was all we could take if we wanted to sell our goods.

Balances and Barriers

England and other debtor nations which have usually bought from us more than they sold us have been to a large extent dependent on shipping to help meet their trade balances. Yet in the American Merchant Marine Act of 1920 we declared one of the purposes of the Act to be to develop a merchant marine sufficient to carry the GREATER portion of our commerce. I emphasize "greater" because it seems to me that the use of that word was an unnecessary irritant—particularly when coming from a country like the United States that has sold more than it bought and that, under such conditions, should expect the buyer to control routing more than the seller. If it is our policy to carry the greater portion of our foreign trade, then surely England, France, Germany, Holland, Italy, Japan, and any other nation, has just as much reason and more to lay down a similar shipping policy.

As a matter of fact, we have not carried the greater portion of our foreign trade. In 1930, what we carried amounted to only 29.31 per cent. of trade in value, and 37.37 per cent. of trade in volume. Yet if there was any one thing that helped to demoralize shipping in the postwar period, it was the creation of an unnecessarily large American government-owned merchant marine. Few people realize that from the time the war ended or, say, from about January 1919 to June 1922, over 1200 ships of more than 7,000,000 deadweight tons were laid down and completed by the United States Shipping Board. In other words, instead of cutting off at the close of the war and resting on our laurels, we went merrily on our way building more ships—thus helping to make the plight of all private shipowners much worse.

Then, in addition to all our loans for war and restoration purposes, we have proceeded to build up tariff barriers, making it that much harder for the world to sell to us, and seemingly unaware that other nations were just as free and as able to slap us as we were to slap them. Even in the tax bill now pending, we are considering duties on four commodities which move in large volume. On top of all this, most of our legislators and newspapers are demanding payment by our debtors in full, and at the same time loudly complaining about retaliatory tariff acts which other nations have effected.

Facing Facts

Let us face the facts squarely and speak out. The business world has been soft pedaling on truth, and it is my humble opinion that we are not going to get anywhere until business leaders the world over are ready to face, speak, and act the truth.

If the world can't pay in full what she owes us—and as business men we know she can't—then let us make a settlement and a fixed settlement, and a prompt one, on a basis on which the world can pay; and at the same time endeavor to secure such agreements on reductions

*Address before Annual Meeting Chamber of Commerce of the United States, San Francisco, May 18.

in armaments or what-not as may make for world peace. Then, and besides that, let's start knocking our tariff barriers down instead of raising them. Lots can be accomplished by mutual agreement as between individual nations.

I am not advocating the elimination of all tariffs. But I do maintain that unless and until we show a desire to make it easier for the world to trade with us, there will not be any revival in world trading; and, of course, from the standpoint of the American shipowner in foreign trade, a world movement of goods is essential.

Building for the Future

Business is selfish, to be sure. However, there are varying degrees of selfishness. It is one thing to develop a business or to trade with the sole idea of selling out quickly at a profit—and we have seen where that

speculative element has led us. It is quite another thing to build up a business on the basis and in the hope that it will last and can be passed down to the next generation and succeeding generations; so that not only those who own the business but those to whom it gives a livelihood can depend upon a reasonable and steady income.

If we are to get anywhere in the business of foreign trade, we must build for the future—not for the immediate present. When that is recognized and the American business man is willing to stand publicly on that policy—and to support legislators who will put the good of the whole country ahead of the good of the locality—then, and not until then, can we expect a real revival in international trade.

This may seem like too much idealism, but surely what the business world needs today more than it ever has is at least a touch of idealism!

American Oil Industry

Seventy-Year-Old Business Shows Remarkable Virility and Amazing Growth

SLIGHTLY more than seventy years ago this country had the Drake oil well of Pennsylvania, 69½ feet deep and producing a few barrels of oil daily. Today there are more than 300,000 wells, located in nineteen states. Some are nearly 10,000 feet deep, and combined they produce more than 2,500,000 barrels of oil and millions of feet of natural gas every day. New wells are drilled at the rate of more than 20,000 a year and an annual expenditure exceeding \$500,000,000. The average well costs \$25,000 to complete.

More than 400 refineries, located in thirty states, and representing 85 per cent. of the world's refinery capacity operate day and night to transform the billion dollars' worth of crude oil produced yearly into refined products worth several times that amount. These products are fifth in total value among the country's manufactured goods.

This country's first pipe-line, five miles long, has become a vast underground system of trunk and gathering lines, exceeding 100,000 miles. In recent years new pipelines have been built especially to carry gasoline from refineries and natural gas from the wells direct to city markets. Tank farms and bulk terminals, as well as the pipelines themselves, provide storage for millions of barrels of petroleum and its products. In addition, the industry operates 150,000 tank cars, 95 per cent. of them owned by oil companies, and enough tankships to make up 17 per cent. of the United States merchant marine. Thousands of tank trucks and oil

barges augment this transportation system.

Markets have been established around the world. In this country alone there are more than 350,000 service stations supplying fuels and lubricants for the nation's motor vehicles. Storage terminals, bunkering stations, and numerous outlets provide fueling facilities for half the world's merchant shipping, and for oil-burning locomotives, heating plants, and other consumers.

The petroleum industry produces not only approximately one billion barrels of crude oil yearly, but also some 400,000,000 barrels of gasoline, 60,000,000 barrels of kerosene, 400,000,000 barrels of gas and fuel oils, 34,000,000 barrels of lubricants, and a variety of other commodities. It has developed an export trade amounting to more than \$500,000,000 annually, or one-tenth of the nation's foreign business. It imports, chiefly for refining and export, some 80,000,000 barrels of crude oil yearly.

In the scope of its operations the industry is second only to agriculture. It employs more than 2,000,000 workers, has an invested capital exceeding \$12,000,000,000, with more than 2,250,000 stockholders. The industry is one of the largest purchasers and users of steel, iron, motor vehicles, pipe, stationary engines, rope, paints, rubber, brass, tin, and chemicals. Its orders for tankships make it the second largest patron of the shipyards and it ships a greater tonnage of manufactured products than any other industry.

[Bulletin, Standard Shipping Company.]



The new turbo-electric liners of the United Mail Steamship Company's Great White Fleet preserve the same trim, yacht-like lines that have always characterized United Fruit ships. Our illustration shows the Antigua on her trial trip.

New Turbo-Electric Steamship Antigua

First of Three Passenger-Cargo Liners Building at Fore River Plant of Bethlehem Shipbuilding Corporation is Now in Service on Pacific Coast

THE new turbo-electric steamship Antigua, recently completed by the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., at Quincy, Massachusetts, is in service on the San Francisco Port Armuelles run. She is the first of three sister ships building at that plant to the order of the United Mail Steamship Company, a subsidiary of the United Fruit Company. The second, the Quirigua, is now on her maiden voyage from New York to Caribbean ports, and the third, the Veragua, was launched on April 23 and is well advanced toward completion.

These three ships complete the building program of the United Fruit Company started about two years ago, when three ships were contracted for by the Newport News Shipbuilding and Dry Dock Company and three more by the Bethlehem corporation. All six ships were built under the provisions of the Jones-White Act, and comply with the requirements of the United States Shipping Board for government loans, and also with the requirements of the 1929 Convention for the Safety of Life at Sea. All are built to the highest class of the American Bureau of Shipping.

These new ships built at Fore River are in dimensions and general arrangement similar to those built



Stair-well on the Antigua.

at Newport News, whose description of the Talamanca has already been published. Development of the design was, however, left to the respective builders. Considerable effort was expended to determine the hull form which would best fulfill the requirements of economy and speed, and the very good performance of the Antigua on her trials indicates that the effort was fully justified.

Particulars of the Antigua are as follows:

Length over all	447'-10"
Length on designed waterline	428'-9"
Length between perpendiculars	415'-0"
Beam, molded	60'-0"
Depth, molded to upper deck at side	34'-9"
Designed draft, molded	24'-0"
Displacement, to designed waterline	10,928 tons
Gross tonnage, U. S.	7035.12
Net tonnage U. S.	3523
Cargo capacity, refrigerated	240,070 cu. ft.
Cargo capacity, baggage, mail, etc.....	5,370 cu. ft.
Fuel oil capacity	1,405 tons
Fresh water capacity	730 tons
Passenger accommodations	113 persons

Crew:

Deck Department	21
Engineers Department	34
Stewards Department	48
Pursers, doctor, and radio operators ..	6

Total

Shaft horsepower, normal	10,500
Service speed, knots	17½
Contract signed	5 August, 1930
Keel laid	30 April, 1931
Launched	12 December, 1931
Delivered	1 April, 1932

The official trials of the Antigua were run on the measured mile off Provincetown, Massachusetts, on



A typical stateroom.

March 26 previous to the dry-docking and final underbody painting of the ship. The guaranteed horsepower of 10,500 was very easily reached, and the ship attained a speed of over 19 knots.

The Antigua follows the yacht-like appearance of the passenger vessels of the Great White Fleet. The stem is straight, raked forward; and the stern is of the semi-cruiser type which combines the graceful counter stern above the waterline with the efficient cruiser stern below. A single funnel, placed slightly forward of amidships and two symmetrical pole masts add pleasing balance to the shipshape appearance of the hull and superstructure. In accordance with the custom of the

United Fruit Company, the entire outside of the ship above the waterline is painted white.

Hull

The hull of the Antigua is built of steel, with transverse framing, and is subdivided by eight complete transverse bulkheads into nine major water-tight compartments, exceeding the requirements of the 1929 Convention for the Safety of Life at Sea. There are four steel decks in the hull, above which are a long bridge and forecastle combined, with a short poop, separated from the bridge by a well. Side plating is carried up to the bridge deck level throughout almost the entire length of the ship. Deck houses are erected amidships above the bridge deck and are built throughout of steel, with two decks extending the full width of the ship. The boat deck is sheathed with teak; other decks where exposed to the weather are sheathed with Oregon pine with teak margins. The tops of the deckhouses above the boat deck are of steel, insulated underneath by three inches of compressed cork.

Deck covering in all passenger spaces, except as noted below, is rubber tile, laid on unfinished magnesite. The lounge floor is of white oak laid on top of magnesite; the library floor is carpeted; ceramic tile is used in all baths and lavatories in passenger quarters, and quarry tile in galley and pantry. In crew's quarters, magnesite is laid, generally, for the finished surface. Rubber tile was supplied by the United States Rubber Company. Magnesite flooring by Selby & Battersby.

All cargo holds are insulated by means of granulated cork with spruce sheathing. A large refrigerating plant is provided, with carefully arranged cooling and air circulating units and ducts in order to provide satisfactory refrigeration for the cargoes of bananas which the ship carries. The cargo space is divided into two holds forward and two aft; the total number of compartments is sixteen, including two special cargo compartments aft which can be cooled to a lower temperature than the rest. Below the orlop deck aft, the space is utilized entirely for refrigerating machinery and tanks. All cargo refrigerating machinery is the product of the York Ice Machinery Corporation.

Passenger Accommodations

The interior design and decoration of the public spaces of this ship have been carefully studied and developed. They show a marked superiority over the interiors of other ships of this class, and are comparable to those of any ship afloat. The entire scheme, including furniture, carpets, and electric fixtures, was designed within the Bethlehem Shipbuilding organization. The style as a whole is a simple and refined expression of modern design. The fitness of detail and sturdy character of mass combine to produce a very effective appearance. With the exception of two period style rooms the interiors have an individual character and were developed to meet this particular problem. They represent a decided step in the growth of a design especially characteristic of ship limitations.

The foyers are paneled in mahogany of rich brown with blue rubber tile floors in contrast. Pilasters carrying ceiling beams are topped with small panels boldly carved and colored. The stairs are of the continuous stringer type with balustrades of broad bands of white bronze carried parallel to the run of the stair. The whole design of the stair is original in ship work and has been developed primarily to suit ship conditions.



Three views in the public rooms. Upper, the lobby and grand staircase; center, smoking room; lower, the deck ballroom.

and this result has been obtained without loss to the decorative quality but with a decided advantage from the point of view of ship operation.

The design of the dining saloon is a clever combination of Empire period mass with delicate modern detail. The walls and ceiling are painted a soft putty color which forms a delightful background for the black and gray floor and the silver and blue hangings. There are well placed mirrors reflecting the cheerful dignity of the room.

The library is well-conceived in the early American style. Wide bays in the sides of the room are sheathed with random-width chestnut and are broken with a charming mantel flanked with quaint bookcases. The ends are paneled in chestnut below the chair rail and in plaster above. A few old prints, crewel work curtains, fine characteristic furniture and a beautiful carpet, made to simulate a hooked rug, all go to create a restful atmosphere of comfortable smartness.

The lounge is in a gayer spirit but yet richly simple. The walls of cross-veneered English bog oak lend a harmonious setting to the blue, green, and henna covering of the low furniture. In the after bulkhead is an attractive mural depicting great Spanish galleons on a glassy southern sea, while the forward bulkhead is decorated with a panel of black glass etched with silver and set in a niche flanked with a large fluted quarter columns with a dull black finish. The ceiling is relieved by a well-proportioned dome of glass capable of spreading a colorful play of light through the room. Large panels of wood carved in the modern manner, some to represent jungle foliage and some tropical fish, and covered with gold leaf toned down with an amber glaze, are set over the door openings. The general color tone of this room, a warm golden brown, is enhanced by the use of dull black and silver to accentuate the lines and proportions of the mass.

The smoking room is a simple expression of construction and is truly different, entirely simple and yet with a distinctive atmosphere. Sheathed with random width oak, stained brown with grain brought out slightly in gray, this room is tastefully decorated with red and gold hangings, blue-green and lacquer-red leather upholstery. In the forward bulkhead is a bar, which, when closed, displays three leaded glass panels cleverly representing the New York skyline, the ship at sea, and Morro Castle. The lacquer-red rubber tile floor picks up the red striping in the joints of the sheathing and on the bottom member of the cove cornice.

Forward on the bridge deck on both sides is a suite of rooms each consisting of a sitting room, two bedrooms, and two baths. One suite is of rich brown mahogany with special furniture, hangings, and spreads. Prints of a strong Chinese character decorate the walls. The other suite is identical with the exception of the hardwood walls and furniture.

The deck ballroom, half open to the sea aft of the promenade deck, is designed to represent the courtyard of an old English inn, and with its half-timbered walls with decorated plaster panels, its curious brackets and moldings, it certainly expresses the designer's purpose. The ceiling shows steel construction and is painted a cool blue gray. As a whole, it is an ideal space for hot afternoons.

All of the public spaces are equipped with radio loud-speakers and the deck ballroom has a hard pine floor for dancing. The electric fixtures were particularly designed to fit the character of the rooms and add greatly to their attractiveness.



The library of the Steamship Antigua, shown in the upper view, is a very charming room in Colonial American style. The dining room, shown in the lower illustration, is a modern adaptation of the Empire Period.

Galley

The galley on the Antigua is electrically equipped throughout with Edison General Electric appliances, including a 3-section automatic range, broiler, bake oven, egg boilers, waffle irons, toasters, and steam and electric coffee urns. Other galley outfit includes steam kettles, tables, bain maries, dressers, mixing machines, Crescent dishwashing machine, proofer, vegetable steamer, dough trough, and sinks; and all these were supplied by Jones McDuffee and Stratton. Refrigerators in the galley and pantries are built in, and are operated by the ship's stores refrigerating system. Separate General Electric refrigerators are installed in the lounge pantry on the promenade deck and in the crew's galley aft. A special General-Electric refrigerator is fitted in the beverage room adjacent to the smoking room.

The crew's galley aft is excellently equipped with appliances of the same make and high quality as the main galley. Accommodations for officers and crew are noteworthy as being exceptionally fine; officers' staterooms are equal in furnishings to those provided for passengers.

Propulsion Machinery

The Antigua is driven by twin screws, power being transmitted by General-Electric motors designed to develop a total of 10,500 shaft horsepower at about 125

revolutions per minute. These motors are of the synchronous induction type, having a rated output of 4200 kilowatts each, continuous load, at 125 revolutions. 3-phase alternating current is supplied at 3150 volts by two turbine-driven generators, each of which is designed for a maximum shaft horsepower of 5500. The steam turbine revolutions at rated power are 3500, steam being supplied at 325 pounds pressure and 230 degrees superheat by four Babcock and Wilcox boilers of the standard marine type. Total generating surface of these boilers is 22,500 square feet, and interdeck superheaters of 2250 square feet are fitted. Desuperheaters are fitted to the boilers for supplying saturated steam to certain auxiliaries and feed water regulators are provided. The fuel used is oil, and Todd fuel oil heaters and burners are fitted.

Condensers installed on the Antigua were designed and built by the Fore River Plant, and are located directly under the main turbine units. A feature of the installation is that the turbine-driven auxiliary generators are arranged to exhaust steam to the main condensers while the ship is under way, making it unnecessary to operate the auxiliary condenser and pumps connected with it, since all auxiliaries normally required at sea are motor driven.

The propellers are 15 feet 6 inches in diameter and are solid manganese bronze, each having three aerofoil blades. Propellers were cast by the Cramp Brass and Iron Foundries. Kingsbury thrust bearings are installed.

The electrical installation throughout is of General-Electric manufacture, including the turbines which drive both main and auxiliary generators and all electric motors on auxiliaries and deck machinery. Pumps are almost entirely products of the Warren Steam Pump Company; the lubricating oil pumps, fuel oil service pump, evaporator feed pump, and priming pump being the only exceptions. Davis Paracoil evaporators and distillers are installed, and all boiler feed water is distilled.

Deck Auxiliaries

Cargo handling facilities are provided for general cargo and consist of eight 5-ton booms and one 30-ton boom, the latter over No. 2 hold. Eight Hyde cargo winches are fitted, all of 2000 pounds capacity at a hoisting speed of 270 feet per minute, each being driven by a General-Electric motor rated at 35 horsepower at 550 revolutions per minute. One of these winches forward is connected by gears to a pair of warping heads for use in mooring ship. A separate mooring winch, of Hyde manufacture, is fitted on the poop deck, driven by a 35 horsepower motor. Two capstans are located on the forecastle, products of the American Engineering Company. Motors driving them are located on the deck below. A Hyde windlass is fitted to handle the anchors, power being supplied by a 75-horsepower motor. All manila cordage is Columbian "Tape Marked."

Navigation Gear

The steering gear is of the electro-hydraulic type, with two rams arranged athwartship and duplicate pumps are provided, controlled by telemotor from the wheel house and with arrangement made for operation by gyro-pilot. Emergency steering control is arranged with a trick wheel in the steering gear space and a steering stand on the docking bridge aft. Each pump is operated by a separate motor of 30 horsepower. The steering gear and telemotor were furnished complete by the American Engineering Company.

Lifeboat arrangements are modern and complete, with ample capacity for all persons on board. Boats are provided as follows: 5 lifeboats, 26 feet, capacity 50 persons each; 1 motor lifeboat, 26 feet, capacity 37 persons; and 3 balsa floats, capacity 25 persons each. Davits are of the Lane mechanical type, and all boats and davits were supplied by the C. M. Lane Lifeboat Company. Two Lidgerwood electric boat winches, driven by 15-horsepower motors, are fitted to handle the lifeboats.

Anchors and cable were supplied by the Baldt Anchor Chain and Forge Corp. Two main bower anchors of 9415 pounds weight each, a spare bower anchor of 7980 pounds, and a stream anchor of 3395 pounds weight are carried. Anchor cables are of 2-7 16-inch forged iron stud link chain in two 165 fathom lengths.

The very complete navigating equipment was supplied by the Kelvin and Wilfrid O. White Company and includes, besides the usual binnacles, compasses, and other instruments, a hand sounding machine and a Walker taffrail log. A Submarine Signal Company Fathometer forms a part of the navigating outfit. A Sperry gyro-compass system is installed, with master gyro-compass in a separate room in the officers' quarters on the boat deck, and repeaters in the wheel house, on the flying bridge, and in connection with the R.C.A. radio direction finder in the chart room. A Sperry rudder indicator system and two Sperry 18-inch incandescent searchlights are installed. Electrically operated shaft revolution counters were furnished by the General Electric Company. Henschel electric whistle operators are fitted in addition to hand controls, and a Henschel telephone system provides communication between bridge, chief engineer's stateroom, engine room, fore-castle deck, and docking bridge. Another telephone system is installed for communication between the staterooms of various officers of the ship. The ship is fully equipped with electrically operated clocks, the master clock being located in the chart room.

Heating and Ventilation

Public passenger spaces, foyers, passageways and the like; also officers' and crew's quarters, are heated by steam radiators. Passengers' staterooms are heated and ventilated by a thermo-tank system which supplies heated air to all rooms; also the forced ventilation to public rooms and to certain storerooms and portions of the officers' and crew's quarters, is heated; assurance is had, therefore, of ample heat under all conditions. Mechanical exhaust ventilation is provided for galleys, pantries, baths and toilets, and smoking room.

The fire detecting and fighting system is in accordance with the most modern marine practice, and includes a Henschel electric automatic fire alarm system, with thermostats located in all public spaces, in each stateroom, and in officers' and crew's quarters, and storerooms. Alarm of fire is automatically given on an annunciator in the wheel house, with a simultaneous bell signal in the engine room. Manual fire alarm boxes are located in various parts of the ship and form part of the main electric fire alarm system. The customary Lux carbon dioxide system, steam smothering lines, and Rich fire detecting system are also installed to cover the boiler room, fuel oil filling stations, and cargo holds; and a fire main and sprinkling system (the latter for protection to the main motors and generators) together with a number of portable chemical extinguishers complete the fire fighting arrangements.

Short History of Tonnage Measurement

Analysis of the Influence of Tonnage Laws on Marine Transportation Equipment

By G. Brick Smith*

TO trace back through the centuries the influence of tonnage laws on the design, construction, and operation of vessels is extremely interesting, and, by an analysis of the various types of vessels evolved through such laws at the different periods, the importance of "tonnage measurement" in the shipping industry is readily appreciated. It is evident too, from such examination, that the subject has not in recent years received anything like the consideration it deserves. Historically, the important periods in ship tonnage measurement may be considered broadly as being two; one before and one after the passing of the British Merchant Act of 1854. Some form of tonnage measurement has undoubtedly been in existence from the time ships were first used for the carrying of merchandise, but, though very little is known of such laws prior to the above enactment, that little is of vast interest to all people connected with shipping.

The English Tun

We cannot, of course, definitely determine the derivation of the present day system of measurement nor of the unit used, the ton, but in its original use in England the ton was not intended to express weight. The word ton is derived from "tun" which was a modification of the monastic word "tunna", meaning barrel, or perhaps from the ancient Latin word "tina," a wine-ship. So it is evident that it was a measure of capacity and not weight.

About 1416, in the reign of Henry V of England, the carrying of wine in tuns containing less than 252 gallons (40.2 cubic feet) was prohibited. If you include the barrel itself, the external volume occupied by such a tun, was approximately 42 cubic feet, which corresponds to the freight ton now used in shipping. It is also interesting to note that the tun in question was equivalent to approximately 2240 pounds. Even prior to this, as a matter of fact before the year 1300, dues were levied in England on wines transported, these dues being termed "prisage." This prisage amounted to one tun out of every ten to twenty tuns of wine carried. In addition to prisage it was also customary to levy other taxes on wine and articles imported into England, from which practice the name "customs" has originated. These taxes were termed "tunnage" and/or "poundage."

As vessels carrying ten tuns of wine were customs free, while those of from ten to twenty tuns capacity or over were subject to taxation, the number of vessels under twenty tuns greatly predominated. From this it will be seen that even in medieval times the then existing tonnage dues considerably affected the size of a vessel. In 1303 the imposition of prisage was stopped and a direct tax of two pence per tun was substituted on vessels importing wine into England.

Tonnage Tax

In 1379, Richard II equipped a fleet to take action against the French, and to defray the cost of this fleet he fixed a tax of six pence per tun on outgoing as well as on incoming ships. Prior to this, "tunnage" had represented only a tax on cargo, but as a result of King Richard's levy, the term tuns now also came to represent the size of the vessel. That this method of expressing the size of a vessel became general is substantiated by much documentary proof.

For instance, an article dated in the year 1338 represents the largest English "kogge" (a Hanseatic type of cargo vessel, also used for war purposes) as measuring 240 tuns. The tonnage in all cases appear to be given in round numbers until the Sixteenth Century, when this incorrect procedure apparently ceased, as evidenced by available data describing the British war fleet. From a study of these data it is seen that an attempt was then being made to scientifically determine a vessel's size. The method prescribed was to multiply together the length of a vessel's keel, the breadth, and the depth, dividing this product by 100. That this was the approved procedure generally followed to determine a vessel's tonnage is also indicated in the works of William Monson about 1642, and that it was not confined alone to warships is proved by the particulars of the English East Indies Company's fleet of that period, this information being still available.

The value of tonnage obtained in the manner described in the preceding paragraph represented, at the time of its use, quite a fair approximation of a vessel's carrying capacity, the ships then in use differing very little in size or design. But with the increase in English shipping there arose an added necessity for still more definite and, if possible, a universal method of ascertaining the carrying capacity of a vessel. The tun of 252 gallons heretofore solely a measure of capacity also became a measure of weight, representing approximately 2240 pounds. In this connection it is interesting to note that in 1660, during the reign of Charles II, it was enacted that all French ships were to pay five shillings per tun of "burden."

Tonnage Rules

"The Complete Shipwright," edited by Edmund Bushnell, an Englishman, was published in 1678, and among the data contained therein, a rule was set forth to express the size of a vessel in tons. By this rule the size of a vessel was determined by multiplying the maximum outside breadth with the half-breadth and the length of the vessel's keel, and dividing the resultant product by 94 or 100, depending upon the size and shape of the vessel and perhaps also to some extent on the requirements of the owner. This rule was in general use among shipwrights upon the Thames River, the use of the half-breadth in lieu of the depth being adopted, so that some means would be available for ascertaining the tonnage of the vessel under all conditions.

Mr. Bushnell, in presenting this rule, pointed out that

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such method could not express the exact carrying capacity due to varying "co-efficient of fineness" and to difference in the weights of the vessels themselves. He therefore advocated that the area of the light vessel water plane and the load water plane be determined and the volume of the body between these two planes be definitely ascertained, allowance being subsequently made at the various transverse sections to take care of "rounding."

Considering the size and types of vessels dealt with, Mr. Bushnell's area method gave a very good approximation of the carrying capacity, but it was obviously difficult and impractical to secure correct data. Nevertheless, it is the basis of the method at present applied to vessels on inland waters of Germany, France, Belgium, and other countries in determining their carrying capacities. This rough area method of Mr. Bushnell's was, as a matter of fact, the first rule evolved for measuring the deadweight capacity of vessels for tonnage purposes.

In 1694, under the reign of William of Orange, the English Parliament enacted the first actual English tonnage measurement act, according to which London Shipwright's rule of Monson with slight modifications was adopted, the half-breadth being substituted for the depth measurement, and the divisor 100 changed to 94. In defining length of keel, the Act read "as much as she treads on the ground;" for breadth, "across the greatest beam taken inside to inside planking;" and the depth was defined as follows "of hold from the plank below the keelson to the under part of the plank of the uppermost deck to which cargo is stowed." This Act also prescribed methods for measuring certain types of inland water coal carrying vessels called "keels."

Keel Taxes

From early Anglo Saxon times there had been in use on the River Tyne coal carrying barges called keels. These were of a definite size which could carry a fixed quantity of coal. A tax was levied upon these coal carriers, this tax being a certain fixed figure per keel. Naturally this method of tax levying led to the building of larger and larger keels, so that a relatively large cargo of coal could be carried upon the fixed rate then established per keel. This resulted in an effort by legislative restriction as to the size of keels to render tax evasion impossible. As early as the Fourteenth Century there existed at Newcastle regulations regarding the measurement of keels, but the first actual law regarding this matter was enacted in 1422, when it was stipulated that keels should be limited to the portage of 20 chaldrons, which corresponded to eight wagons having a capacity of 126 cubic feet. Keels were required by law to be officially measured, and as there existed at that time keels of 23 chaldrons, these were taxed two pence per chaldron.

In the year 1679, during the reign of Charles II, a law was passed that any rules which had been promulgated by the government governing the keels in operation on the River Tyne should also apply to those on the River Wear, and in the tonnage measurement act of 1694 it was stipulated that the tonnage of the "keel" was in future to be expressed in terms of weight measure instead of volume. To meet the requirements of this law, the keels were measured by being officially loaded with iron or lead to a predetermined load line mark of nails driven into the stem, sternpost, and midship planking. It was further stipulated that for loading of these keels, chaldrons of 53 hundred-weights were to be used. The tonnage measurement act of 1694 imposed very burden-

some taxes on shipping for the purpose of defraying the expenses of the war with France, but as these taxes appeared to be highly detrimental to trade, the Act was repealed in 1696 as far as the taxes were concerned, and apparently legislative control of tonnage measurement then lapsed.

"Builder's Old Measurement Rule"

William Sutherland, an English naval architect, published "The Shipbuilders' Assistant," in 1711 and from a perusal of this book it is evident that Bushnell's linear dimension method was in use at that time and that the formula prescribed by the Act of 1694 was being enforced; the divisor had been changed from 94 to 95, and to 100 for vessels of war carrying cannon. Though Mr. Sutherland and others agreed with Mr. Bushnell's contention that this method of determining a vessel's size was incorrect, the rule was nevertheless embodied in the Act of the English Parliament of 1720, and continued in use as the "Builders' Old Measurement Rule" until the year 1835.

The Act of 1720, however, did not permit of general application any more than that of 1694 and was intended principally as a means of checking the smuggling of spirits into England. The Act prohibited the importation of wine in vessels of less than 30 tons burden, which burden was subject to official checking, a procedure formerly only applying to keels. Due, however, to the general dissatisfaction arising out of this new requirement, the majority of vessels in service were not actually measured as stipulated.

In 1773, under King George III, the question of tonnage was for the first time carefully considered, and a new act was passed whereby tonnage measurements were made to apply to all merchant vessels. This Act did not, however, change the Builders' Old Measurement Rule, with the exception that the keel length was defined and was obtained by ascertaining the length along the rabbet of keel from the after side of the sternpost to a perpendicular from the fore side of the stem under the bowsprit. From this measured length, three-fifths of the breadth was subtracted in an endeavor to obtain the length of the straight keel without the necessity of docking the vessel. Three years later this method of measurement was modified so that when a vessel was measured afloat an allowance of 3 inches per foot of loaded draft was to be made to offset the rake of sternpost. The breadth was to be measured at the broadest place upon the outside of the shell planking exclusive of the "wales." The Builders' Old Measurement Rule was again modified in 1819 so that it would be applicable to vessels propelled by steam power. According to this modification, the length of keel was to be diminished by the length of the machinery space; thus the volume of this space became a deduction from the tonnage and has continued so ever since.

Effect of Old Measurement Rule

The Builders' Old Measurement Rule had a very bad effect upon shipbuilding in England and Scotland, inasmuch as the owners and shipbuilders naturally endeavored to build the largest possible vessel having relatively the smallest tonnage. To attain this end the vessels were made fuller of form and with depth to breadth ratio increased 0.75 to 1, instead of as formerly approximately 0.50 to 1, resulting in very full, narrow, and deep vessels of relatively great length, in most cases entirely unseaworthy.

Due to this tendency to build unseaworthy, or at least

very cranky vessels, and the general dissatisfaction with this method of tonnage measurement, a commission was created by the British Government in 1821 to investigate conditions in general and suggest revisions to the Act (Act of 1773). This commission suggested a deadweight capacity measurement of the volume existing between the empty vessel water plane and load water plane, exactly similar to the proposal advanced by Bushnell 143 years earlier; but they pointed out that, in their opinion, the application of such a method of measurement was not generally possible and they therefore suggested, as an alternate proposal, the internal measurement of vessels. This latter was accomplished by measuring the vessel's breadth at 5 points of the length, and the depth at two places; the product of the mean breadth by the mean depth thus obtained was to be multiplied by the length, and divided by 112, this divisor having been selected in order to obtain practically the same tonnage value as would be obtained if the vessel were measured under the Builders' Old Measurement Rule.

British Commissions

These proposals were rejected, and in 1833 another commission was created to deal with the problem. This commission concluded that tonnage measurement should not be based upon a vessel's carrying capacity, which had previously always been the objective, but should be based on the measure of internal capacity, a reversion to the oldest method of all, when the size of vessel was based on number of "tuns" carried. By this measure of internal capacity the commission endeavored to obtain a tonnage value which would indicate, to the greatest degree of accuracy, the earning power of the vessel. They proposed that the internal volume be determined by as few measurements as possible consistent with accuracy, the divisor to be so regulated that on the average the resulting tonnage would be approximately the same as under the existing statutes. They prescribed that the length of the vessel, taken on the upper deck between the insides of the stem and sternposts, was to be divided into six equal parts; the depth of hold at these points of division was to be divided into five equal parts, and the breadth measured at these points.

The average breadths and depths thus obtained were to be added, in a certain geometric manner, and their total sum multiplied by the length of the vessel and divided by 3500. Further, the tonnage of a quarter deck or a poop was to be considered as the product of the principal internal measurements of length, breadth, and 'tween deck height divided by 92.4. The cubicle contents of the engine room between the two adjoining bulkheads was likewise to be measured and divided by 92.4, this volume to be considered as a machinery space deduction.

These proposals were embodied in new statutes covering tonnage measurement, but very soon after they were put in operation it became evident that the simplicity of measurement strived for had so reduced the number of measurements that inaccuracy resulted; it was also soon apparent that the peculiar geometric points of measurement, prescribed for measuring the breadth, tended greatly to influence design. In addition, the divisor was found too small and vessels similar to those which under the old Act had a given tonnage, were made about 7 per cent. larger for a like tonnage value. Designers used every means in their power to evade the Act in the building of vessels, and

on the whole the new statutes were found entirely unsatisfactory.

Moorsom's Rules

To alleviate this condition another commission was appointed in 1849, this time by the British Admiralty, and this commission's report in 1850 suggested that the external capacity of a vessel, inclusive of poop and fore-castle and other superstructures, should be measured. They proposed two rules, one being for vessels afloat in which "girting" was to be used, and in rendering their report pointed out that any deduction for machinery space must of necessity be deemed an undue preference towards steamships. The report of this commission was unfavorably received, principally due to the application of suggested external measurements; and when their proposals were presented to Parliament in 1850 they were promptly rejected. The rejection of the commission's report was in much part due to Mr. Gilmore, a Glasgow shipowner, who, in an open letter to the President of the British Board of Trade, pointed out that over 75 per cent. of the goods at that time transported by British vessels consisted of light weight freight which entirely filled the cargo holds, and he contended that upon that basis a measure of internal capacity was the only logical one for tonnage purposes.

In 1849 the commission then studying the question of tonnage measurement had for its Secretary, George Moorsom, who was a practising naval architect and "surveyor general" for tonnage. He had been trained in the Royal Admiralty School of Naval Architects at Portsmouth and was well conversant with tonnage in all its phases. Although a member of this commission which had advocated external measurement, Mr. Moorsom was apparently not in sympathy with the suggestion and, after Parliament had rejected the commission's proposals, he devised a system for accurate geometrical determination of a vessel's internal volumetric measurement. This system eventually received the support of the members of the 1849 commission, was acceptable to shipowners and shipbuilders alike, and was therefore subsequently embodied in the British Merchant Shipping Act of 1854. In advocating his system of internal measurement, Mr. Moorsom pointed out that, the preponderance of merchandise carried in British vessels being apparently of a light weight character and filling the vessel's entire cargo hold without loading the vessel to its load line, the internal capacity of the vessel was the proper basis for tonnage dues, inasmuch as the cargo carried constituted the principal, if not the only proper, factor. The poops and other superstructures were used mainly to accommodate passengers and such accommodations also frequently afforded much profit to the owners; therefore, upon the assumption that the shipowners' profits were based upon the quantity of cargo stowage space and passenger accommodations available in a vessel, Mr. Moorsom justified his system of admeasurement. Before proceeding with a description of the Moorsom system as embodied in the Act of 1854 and dealing with the various phases of tonnage which arose out of that Act, up to the present day, it might be interesting to digress a little and trace, in general, tonnage as it existed in the continental maritime countries prior to 1854.

(To be Continued)

TRADE CONFERENCES

Association of Pacific and Far East Ports will hold its annual Convention for 1932 at Seattle, July 23 to 25. Headquarters, Olympic Hotel.

Our Ocean Highways

Old Ships, Like Dirt Roads, are Rapidly Becoming Obsolete

By Edward B. Pollister

President, Busch-Sulzer Bros.-Diesel Engine Co.

THE trackless ocean offers equal transportation opportunity to all nations. The ship is the ocean highway. Each nation either has its own or pays heavy toll to use the ships of other nations, especially in time of war. Good roads have ever measured the progress, growth, and prosperity of nations. By the excellence of its ocean highways, the changing status of a nation is largely known to import merchants in all the ports of the world.

With world recovery, the standards of living of other nations, especially to the south of us and in the Orient, will rise; and a still greater demand will be created for American machinery, automobiles, radios, and other products of our ingenuity and mass production methods. For this restoration of our foreign commerce we must prepare.

The time is opportune, therefore, for us to turn our attention without further delay to the improvement of our ocean highways, which have been sadly neglected during the revolutionary modernization of our land transportation. Ninety per cent. of our ocean-going tonnage is obsolete.

Modern fast, economical ships compare with obsolete slow, uneconomical ships of twenty years ago, as new concrete highways compare with old dirt roads,—and present forty-mile-an-hour with former twenty-mile-an-hour freight trains. Since the war, foreign maritime nations have modernized and speeded up their ocean highways—ships—and especially cargo ships, which constituted 71½ per cent. in number and 61 per cent. in tonnage of world ocean-going ships on January 1, 1932. Buyers are quick to take advantage of competitive progress in faster and lower cost transportation, especially where freight must be carried over long ocean routes.

With the exception of our Canadian and Mexican neighbors, all of our export customers live at least several days' journey across the high seas. From New

York, Australia via the Panama Canal, is from twenty-five to forty days away, depending upon the speed of the ship. Accordingly, modern transportation—lower cost and higher speed—is far more essential to our foreign commerce than to our domestic trade.

More expensive, higher speed, land transportation has been a factor in moving westward the center of farm and industry in the United States. Relocating factories nearer the domestic market they serve has increased the distance and cost of transportation to foreign markets, where we must compete for world trade with foreign nations enjoying a shorter freight haul.

The financial return on investment in transportation improvement lies not alone in reduced cost of carriage, but in the additional wealth, the production of which improved transportation makes possible. Adequate facilities for getting goods to market often creates a market for commodities for which a market did not before exist. This is emphatically the case in building up foreign trade.

With the improvement of world business conditions, international buyers of Africa, South America, Australia, and the Orient are bound to consider the transportation equipment and facilities of the seller. To our exporters the value of modern fast cargo carriers cannot be overestimated. Although, in the popular imagination, the floating hotel type of passenger ship which we have been building exclusively during recent years holds the greatest appeal, it is of less importance in developing foreign trade than the cargo ship.

The benefits of a virile foreign trade are shared by all. Meager as it was in 1931 it provided employment for 1,500,000 of our people. Of course, our big business is to supply our own wants; but collectively, we must buy from others coffee, rubber, tin, and many commodities which we do not produce. Unless we sell equivalent excess of our own products, as a nation we will con-

Puget Sound ferry Chippewa, a recent conversion from steam to diesel. In this case, a 1200 shaft horsepower steam plant was replaced by a Busch-Sulzer diesel of 2130 shaft horsepower. No increase in total machinery weight, an increase in speed from 13¾ to over 16 knots, and a reduction in fuel consumption from 10 barrels to a little over 3 barrels per hour were the results of this conversion.



stantly lose a portion of our wealth which will result in decreased domestic employment or a lower standard of living. Our future prosperity depends on the normal expansion of our foreign commerce; and, in the words of President Hoover, "There is only one protection of our commerce from discrimination and from combinations which would impose onerous freight rates. That is to maintain upon these trade routes the regular operation of very substantial shipping under the American flag."

Our present cargo fleet consists largely of obsolete war-time built vessels, utilized, because we had them, to establish trade routes after the war. During the fifteen years that have since passed, not a single strictly cargo vessel for overseas transportation has been built in this country. Modern competitive foreign vessels, from 50 to 75 per cent. faster, operate at from 25 to 50 per cent. higher efficiency. It is imperative that this handicap be removed.

Merchant ships are as essential as navy vessels to national defense. Our obsolete slow speed cargo ships are unsuitable for naval purposes. Our great shipbuilding industry faces almost complete shutdown by mid-winter of 1932. Ships can be built—or modernized—under present depressed conditions at extremely low costs. It has been established that 83 per cent. of this cost goes directly to labor, divided approximately one-half to the shipyard and one-half to industries scattered throughout the country which supply the materials, machinery, and finished products that go into a ship. No other relief measure is so great an employment restorer.

Now, indeed, is the time to modernize our ocean highways, in preparation for the big effort that must be made to restore our world commerce. Outstanding in the modernization of competitive ocean highways is the wide adoption of diesel propulsion by every maritime nation of the world except the United States. According to Lloyd's Report, at the end of March, 1932, diesels were being fitted in 44 out of 48 ocean-going ships of from 6000 to 20,000 tons building abroad—91.6 per cent.—and in 3 out of 5 larger ships of from 20,000 to 30,000 tons. The four 40,000-ton or larger super-passenger liners, requiring power above the sizes in which diesels are now built, account mainly for only 15 marine steam turbines, averaging 44,500 shaft horsepower each, now being constructed by all other nations, compared with 175 marine diesels, averaging 2470 indicated horsepower. In decided contrast, not a single diesel ship in these sizes is building in the United States; while our 18 marine steam turbines averaging 13,500 shaft horsepower compare with only two 2525 indicated horsepower marine diesels. For all ocean-going ships now under construction, Germany is building 1 turbine and 31 diesels; Great Britain 5 turbines and 16 diesels; France 7 turbines and 21 diesels; Italy 2 turbines and 8 diesels; while Denmark, Holland, Sweden, Norway, Spain, Belgium, Switzerland, and Japan are building no marine turbines at all and 99 marine diesels.

Higher speeds increase the propelling power as the cube, and the fuel cost and weight for fast freighters compel selection of diesel engines because of their low fuel consumption.

But some advantage has resulted from the American delay in adopting internal combustion for marine transportation. During recent years intensive development has reduced the weight and cost of earlier diesels about one-half. In modernizing old vessels, twice as much

diesel power can now be put in an existing ship for about the same engine weight and cost, and the ship's speed thus most advantageously increased. For old steamships burning around one pound of oil per shaft horsepower, the same weight of bunker will suffice for more than twice the diesel horsepower, burning around four-tenths of a pound. The smaller space occupied by modern diesels demands minimum hull alterations and, even with double the diesel power, may still increase the cargo capacity of the existing steamer.

A specific illustration of the reduction of space, weight, and cost of new types of marine diesels is the comparison between the air injection, crosshead, Busch-Sulzer diesels supplied the United States Shipping Board several years ago and the new Busch-Sulzer airless injection, trunk piston design of to-day. The 3950 horsepower, 104-revolutions per minute, Shipping Board diesel was 40 feet 10 $\frac{1}{4}$ inches long, 25 feet 3 $\frac{1}{2}$ inches high, weighed 842,000 pounds, and sold for \$74 per horsepower. The new 4200-horsepower, 150-revolutions per minute diesel is 28 feet 2 $\frac{1}{2}$ inches long, 16 feet 9 $\frac{1}{2}$ inches high, weighs 485,000 pounds, and sells for around \$40 per horsepower.

An example of the possibilities of modernizing old ships is the re-engining of the ferryboat Chippewa of the Puget Sound Navigation Company. A 1200-shaft horsepower steam plant was replaced with one of these new type Busch-Sulzer diesels of 2130 shaft horsepower without any increase in machinery weight and with an increase in ship's speed of from 13 $\frac{3}{4}$ to over 16 knots. Although modern steam plants are built lighter than formerly, the over-all diesel machinery weight, including water, was found to be 45 tons less than that of the most modern, high pressure geared turbine steam plant.

The diesel ship, responding instantly to throttle control—similar to the automobile foot-accelerator—is ready at a moment's notice to leave the dock or change from cruising to full speed. It is the automobile—the truck—the navy police car—of the ocean highway.

British Build Remarkable Speed Boat

THERE was recently launched at the Thornycroft Works, Hampton-on-Thames, a motor speed boat, Miss England III. This boat is being built and equipped by Lord Wakefield and will be driven by that great British sportsman, Kaye Don, in the Schneider Trophy and other races.

The hull of Miss England III is of single-step design, 35 feet long by 9 feet 6 inches beam. She will be driven by two V-type, 12-cylinder, Rolls Royce racing aero-plane engines equipped with supercharging. This plant develops a total of 3950 brake horsepower. Propellers are of the two-bladed type and at full speed turn 7000 revolutions per minute. The rotative speed of the engines is geared up to get this speed for the propellers, the gear boxes being located forward of the engines and of the cockpit.

The most interesting feature of the design is that the total weight of hull and machinery works out at 3.23 pounds per brake horsepower.

The designers and builders figure that Miss England III will attain a speed of 130 miles per hour on still water.

Our Merchant Fleet

Its Ships in Comparison with Foreign Ships; and an Analysis of Replacement Program

By H. G. Smith

President, National Council of American Shipbuilders

A COMPARISON of our modern merchant fleet as a whole with those of the other principal maritime nations is desirable and interesting. Chart I shows clearly, for passenger and combination vessels, cargo vessels, oil tankers, and for vessels of all types the percentage that the tonnage built in the ten year period since January 1, 1922, bears to the total tonnage of each nation owned on January 1, 1932. Shipping Board idle vessels that have never been in service and Great Lakes vessels are omitted from United States tonnage figures.

By way of illustrating just what the blocks on this chart mean, take for example the passenger and combination vessels for Germany. Her total gross tonnage on January 1, 1932, was 1,115,728. Since January 1, 1922, Germany has built 810,267 gross tons of vessels of this type. The percentage built within the past ten years is, therefore, seventy-three per cent. of the total. The chart is illuminating as showing that the United States owns at the present time a smaller percentage of modern tonnage of any type than any other maritime nation, and that, if there be added to the United States merchant fleet the tonnage of vessels to be delivered by January 1, 1933, as shown by the double cross hatched area on the chart, we shall still have a smaller percentage of modern tonnage than any other nation for vessels of any type, with the possible exception of passenger and combination vessels for Japan.

Vessels obsolesce rapidly and if we consider vessels not over ten years old to be modern then we find that thirty-six per cent. of world tonnage is modern while only ten per cent. of United States tonnage is modern. For vessels of the cargo type, twenty-eight per cent. of

world tonnage is modern, while in the United States only a deplorably small 2.2 per cent. is modern. Italy has 15.5 per cent. of modern cargo tonnage, all other nations a still higher percentage.

Expressed in tonnage, the United States, upon completion of its present program, will have built but 1,050,000 gross tons of ships since January 1, 1922, against a world tonnage of 20,000,000 gross tons built during the same period. The participation of the United States in world construction of modern vessels has, therefore, been but 5.2 per cent. of the total.

Our Modern Tonnage

Notwithstanding the fact that we have not kept pace with other nations in the construction of modern vessels, those that we have constructed and that are now under construction, are comparable in every respect with the best that have been produced by any nation in the world. In seaworthiness, safety, efficiency, accommodations, comfort, and operation they are not excelled.

Nearly all of our merchant ship construction during the past three years has been due to the Merchant Marine Act of 1928. When vessels now building are completed this Act will have been responsible for the construction of thirty passenger and combination vessels, two freight car carriers, and nine oil tankers, or a total of forty-one vessels aggregating 460,000 gross tons.

A few composite figures concerning this fleet are interesting. The gross tonnage of the thirty passenger and combination vessels is 362,000; their deadweight carrying capacity 237,000 tons; their total pas-

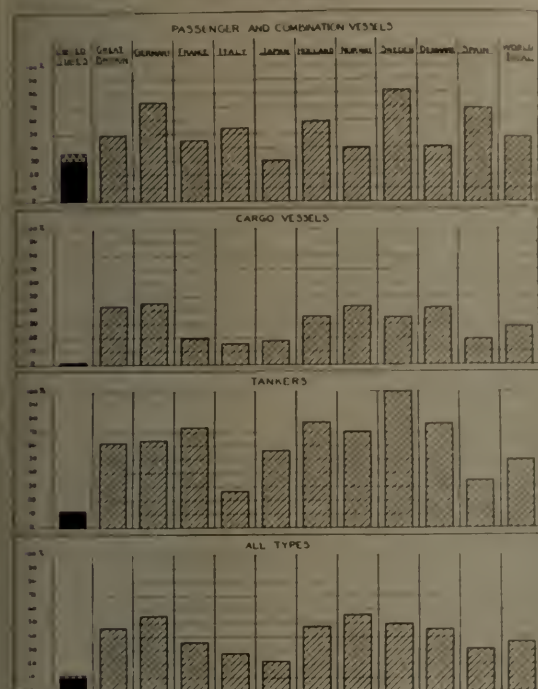
	<u>President Hoover & President Coolidge</u>	<u>Mariposa, Monterey And Lurline</u>	<u>Asama Maru, Tatsuta Maru, Chichibu Maru</u>	<u>Empress Of Japan</u>	<u>Strathnaver And Strathaird</u>
Owner	Dollar S/S Lines	Matson Nav. Co	Nippon Yusen Kaisha	Canadian Pacific	P. & O. Company
Service	Round the world	Pacific Coast-New Zealand, Australia	Pacific Coast-Far East	From Vancouver via Honolulu to Japan & China	England-Australia and India
L.O.A.	654'-3"	631'-6-5/8"	584'	666'	664'
L.B.P.	615'	605'	560'	640'	630'
Beam, M'l'd.	81'	79'	72'	83'-6"	80'
Draft, M'l'd.	32'	28'	28'-6"	30'	29'-2"
Displacement	31,000	26,100	21,800		
General Cargo	556,000 cu. ft.	245,019 cu. ft.	301,600 cu. ft.		
Fuel Oil	6,244 tons	6,606 tons	3,100 tons		
Gross Tonnage	21,936	18,017	16,947	26,032	22,547
S.H.P. (normal)	26,500 (full)	22,000	16,000	30,000 (continuous)	28,000
Service Speed	20 Knots	20 Knots	19 Knots	21 Knots	23 Knots (reported)
Engines	Turbo-Electric	S.R. Geared Turbines	B. & W. Diesels		
Passengers	307 1st Class 133 Special 170 3rd Class 480 Oriental Steerage	475 1st Class 229 Cabin Class	239 1st Class 96 2nd Class 509 3rd Class	1,173	1,168
Crew	322	359	330	579	487
Refrigerated Cargo	29,500 cu. ft.	34,629 cu. ft.	12,800 cu. ft.		

Table showing comparison between recent American liners built for Pacific Ocean service and those built by Japan and Great Britain for comparable Pacific Ocean service.

CHART I

CHART SHOWS THE PERCENTAGE OF SEAGOING MERCHANT VESSELS, EACH OF 2,000 GROSS TONS OR OVER, THAT SUCH TONNAGE BUILT SINCE JANUARY 1932 BEARS TO THE TOTAL TONNAGE OWNED ON JANUARY 1932

(NOTE: DO NOT INCLUDE GREAT LAKES VESSELS NOR THE SHIPPING BOARD'S IDLE FLEET THAT HAS NEVER BEEN PUT INTO OPERATION)



passenger carrying capacity 13,100; their total shaft horsepower 418,000; their range of speed fourteen to twenty-one knots with an average of about eighteen knots, with a general cargo carrying capacity of 7,710,000 cubic feet, and an additional refrigerated carrying capacity of 2,265,000 cubic feet. The total contract price of these vessels was about \$154,000,000, giving an average employment in shipyards and allied industries over the three year period of depression during which they were built to approximately 28,000 men, one-half in the shipyards and the other half in industries all over the United States, as shown on Chart IV appended. When in operation these vessels will require a crew of approximately 5900 men. The nine tankers have a gross tonnage of about 81,000, a deadweight of 122,000 tons, and a combined oil carrying capacity of 35,000,000 gallons per trip.

Replacement Program

The determination of our future needs for seagoing vessels requires a few assumptions both with reference to our shipping in foreign trade and in domestic trade. We must determine as accurately as possible the future volume of our exports and imports in order to ascertain the ships required to carry the greater part of them. This has been assumed to be equal to the average volume for the years 1922 to 1928, inclusive, which is above the figure for 1931 but well below the figure for 1929.

It seems fair to assume that with a stabilization of rates the future volume of our shipping in coastwise and intercoastal trade will not be less than that engaged in these trades in 1931, and that our future oil

tanker tonnage will be at least equal to that owned in 1931.

We must assume also an average life for a ship, which is pretty well recognized the world over to be twenty years.

Chart II, Curve A, shows the tonnage of United States cargo and combination vessels owned by companies engaged in foreign trade on January 1, 1931, and includes vessels operated by these companies in coastal, inter-coastal, and Great Lakes trades. (The Shipping Board's idle fleet is excluded.) The chart shows the gross tonnage that will become twenty years of age during each year up to 1952. As may be seen, we have about 850,000 tons of obsolete tonnage prior to 1931. About 50,000 tons becomes twenty years of age in 1932; 100,000 tons in each of the years 1933 and 1934; somewhat less in 1935 and 1936; about 150,000 tons in 1937; and a tremendous jump to 800,000 tons in 1938; with a maximum of about 1,100,000 tons in 1939.

Curve B shows the cumulative tonnage that has become twenty years of age as of January 1 on each of the years under consideration. It shows that by January 1, 1938, we will have nearly 1,500,000 tons twenty years of age, by January 1, 1939, 2,250,000 tons, and by January 1, 1940, nearly 3,500,000 tons.

Curve C shows the percentage of our total tonnage at the beginning of each of the years in question that has become twenty years of age. This diagram takes account of the new tonnage now being constructed and which will be constructed under the requirements of existing mail contracts and shows that by 1939, including new tonnage built to that date, over forty per cent. of our shipping will be twenty years of age, and by 1940 over sixty per cent.

If the United States were to retain the same volume of obsolete tonnage that it now has and were to replace each vessel in its fleet as soon as it became twenty years old, the building program would have to follow the dot and dash line A. This is, of course, undesirable and wholly impracticable as it would duplicate to a large degree from 1938 to 1940 the war-building program. No such replacement program can, of course, be anticipated although an average volume of 210,000 gross tons annually of vessels of the passenger, combination and cargo types will be necessary to meet the assumptions outlined above.

Chart III applies to tanker tonnage only of seagoing vessels each of 2000 gross tons or over, aggregating about 2,450,000 tons, engaged in deep sea service. While at the present time there are only about 50,000 tons of tanker tonnage twenty years or more of age, a

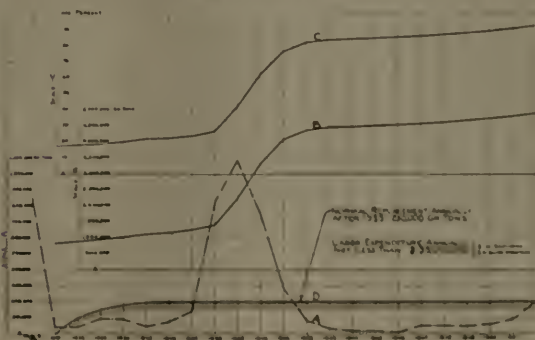


Chart II. Merchant shipbuilding outlook, excluding tankers.

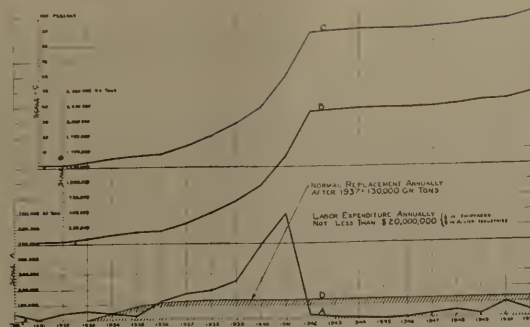


Chart III. Tanker building outlook.

rapidly increasing amount becomes of this age each year after 1935, and the line A of obsolescence is very similar to that for cargo and combination vessels except that the peak is reached in 1941 instead of in 1939. As shown by Line C, 60 per cent. of our tanker tonnage will be twenty years of age in 1941. However, if we take into account the fact that tankers in modern service obsolesce more rapidly than other types of vessels, the peak of obsolescence can be assumed to be reached at about the same time as that for cargo and combination vessels. The replacement of our tanker tonnage, provided each vessel were replaced when it became twenty years of age, would involve a large construction program in 1940 and 1941. Actual replacement is not likely to follow the Line A shown on Chart III, but it will require ultimately a replacement program averaging about 130,000 gross tons of oil tankers per year.

Vessels shown on Chart II, together with those shown on Chart III, will require a future construction program of seagoing merchant vessels of all types of approximately 340,000 gross tons annually.

Shipbuilding Program

A desirable replacement program from the shipbuilding point of view is quite different from what is likely to take place. The most important factor in economical shipbuilding is the continued employment of a reasonably uniform staff of technical and mechanical employees. As shown on Chart IV, there is little possibility of maintaining uniform labor conditions during the next few years. After July, 1932, there will be a rapid falling off in shipbuilding labor employment, because contracts now underway will be completed and no new work is in sight. The conduct of the shipbuilding indus-

try requires engineers, architects, and mechanics, specially trained to the work over a period of years, whose efficiency depends upon the continued practice of their professions and trades; and if such men are once lost to the industry they are difficult to replace. Serious depression in this highly specialized industry is, therefore, very harmful to economy in ship construction.

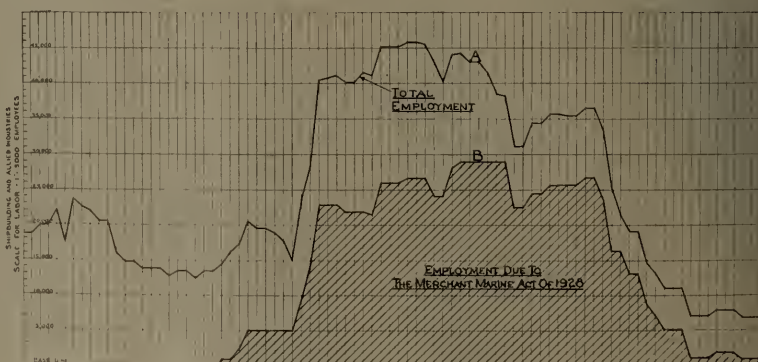
The most desirable program of replacement from the shipbuilder's viewpoint would be one that would begin the replacement of our obsolete ships at the earliest possible date and that would result in an approximately uniform annual tonnage production. Charts II and III show such a program on Line D.

While it is thoroughly understood that in the present depressed condition of business throughout the world the desired most economical shipbuilding program will not materialize, nevertheless, if our assumptions are correct as to the volume of tonnage shown by Charts II and III that must be constructed within the next twenty years, the nearer the approach to an average annual production the lower will be the cost of construction.

As stated, the outlook for shipbuilding for the next year or two is not good, as aside from the seagoing merchant tonnage that has been discussed the only other source of demand is for small craft and for government vessels—the outlook for neither of which is encouraging for the immediate future.

Looking beyond the immediate future, however, I am optimistic as to the shipbuilding industry, as an annual demand for 340,000 tons of seagoing merchant vessels, together with small craft and such government vessels as may be built, should give a sufficient volume of shipbuilding to maintain the industry in good activity on both the West and East Coasts of the United States; and in voicing these few words of optimism, I subscribe to the belief of your most eminent ship owner and operator, the late Captain Robert Dollar, that the greatest future of the American merchant marine is upon the Pacific Ocean and that, consequently, the larger percentage of future ship construction will be for vessels to operate upon those waters. In 1931, a year of severe depression in our foreign trade, when the total volume of our exports to other countries declined over 20 per cent. from the preceding year, the combined volume of our exports to Japan, China, and India showed an actual increase of about 6 per cent. Not only have our exports to these countries increased, but our imports from them have increased, and in 1931 they constituted 27 per cent. of our total imports as compared with about 15½ per cent. prior to the World War.

Chart IV. Employment due to construction of seagoing vessels from 1927 to 1933, inclusive, both in the shipyards and in the allied industries building machinery and equipment for the ships.



Hydraulic Dredge Freeport

Practical Design in which Diesel Engines, High Speed Pumps, and High Voltage Electricity Combine for High Capacity at Low Space, Weight, and Cost

THE Trimount Dredging Company of Boston, designing a dredge for special service, was faced with the engineering problem of selecting the equipment (of least installation and operating costs and greatest capacity) that could be installed within its limiting over-all dimensions of 65 feet length, 28 feet beam, and as little draft as practical. After careful consideration of available prime movers, the company selected diesel drive for the main pump and diesel-electric drive for the auxiliaries.

Since a hydraulic dredge pump operates almost continuously at full load, a Fairbanks-Morse diesel of the moderate speed, heavy duty type was chosen for the pump drive. The unit selected was the Model 33-C-10 $\frac{1}{2}$, pump scavenging, 7-cylinder diesel, developing 360 brake horsepower at 360 revolutions a minute. In order to conserve weight and space, this engine is connected to the pump by a short V-belt drive, so that the pump runs at 500 revolutions a minute. The pump is a 14-inch centrifugal, especially designed for dredge service by



Exterior view of the hydraulic dredge Freeport, showing the spacious house for crew accommodations, massive A-frame and ladder, and the small house over the 40-horsepower cutter-head motor.

the Norbom Engineering Company. This pump has a rated capacity of 170 cubic yards of solids per hour through 3500 feet of discharge line on the basis of 10 per cent. solids in the water.

For auxiliary power there are two units; a 3-cylinder, 8 $\frac{3}{4}$ -inch by 10 $\frac{1}{2}$ -inch, 90-horsepower, Fairbanks-Morse diesel, direct-connected to a 60-kilowatt, 30-phase, 60-cycle, 2400-volt alternator with direct-connected exciter; and a 4-cylinder, 6-inch, by 6 $\frac{1}{2}$ -inch, Fairbanks-Morse, diesel engine rated 45-horsepower at 600 revolutions per minute driving through Flex-mor V-belts, a 30-K.V.A. alternator and a 1.5-kilowatt type D. H. exciter.

The smaller engine generator set is a 240-volt unit connected into the low voltage side of a transformer bank. During normal operation of the dredge it is run in parallel with the 60-kilowatt, 240-volt unit. The smaller auxiliary equipment is driven by 3-phase, 60-cycle, 240-volt motors, the current for which and for lighting is normally taken from the low voltage side of the transformer bank. When the larger generating unit is shut down, the smaller generator set is operated directly on the line with the transformer bank dead and supplies power for the small auxiliary motors and lights. Maxim silencers are used on the two larger diesels and a Yankee stack on the smaller unit.

The cutter head is driven by a 40-horsepower, 2200-volt motor, and the conventional hoisting and winding gear is driven by a 20-horsepower, 2200-volt motor.

For the clear water line, for maintaining the required pressure on the packing glands of the main dredge pump, also for the thrust bearing of this pump,



Engine and pump room on the Freeport. At the left: 7-cylinder, 360-brake horsepower Fairbanks-Morse diesel. In center: the 14-inch centrifugal with its V-belt drive. At the right: the 90-horsepower Fairbanks-Morse diesel-electric generating set.

there is provided a 25-horsepower motor driven centrifugal pump which maintains a pressure of about 115 pounds per square inch.

As the main engine is not equipped with built-in water and oil pumps there are two 5-horsepower motor-driven rotary oil pumps provided for the circulation of lubricating and piston cooling oil, one being auxiliary to the other. The transfer pump for scraper ring oil is also a motor driven unit.

For supplying starting air, there is a single-stage built-in air compressor on the 3-cylinder, 8¾ by 10½ generator set, as well as a 2-stage, Type-H compressor driven by a 3-horsepower Type H motor.

For cooling water circulation, there are two 2-inch centrifugal pumps, each direct-connected to a 5-horse-

power Type-Q, 1750-revolutions per minute, 220-volt motor.

The cutter head ladder and A-frame are of massive construction and are designed to operate for depths of 25 feet. Dredge Freeport carries, for 24-hour service, a crew of 20 men; and quarters for this crew are provided aboard with a fine galley, electric refrigeration, good sanitary arrangements, and a steam-heating system. The service tank for fuel oil holds 800 gallons. In operation a tank scow of 1500 gallons capacity is moored alongside and is towed away for refilling whenever necessary.

With all equipment installed, service tank filled, and dredge ready for operation, the draft forward is 40-3/8 inches and the draft aft 38-3/8 inches.

United States Motorboat Forester

*Interesting 55-Footer for the Alaska Forestry Service in Alaska Waters
Completed in Coast Shipyard*

ANOTHER diesel craft has been added to the extensive and rapidly growing fleet operated by the United States Government in Alaska waters. She is named Forester and is a compact, finely laid out 55-footer, heavily built, wooden vessel from the ways of the J. M. Martinac Shipbuilding Company, Tacoma.

The Forester was built under the personal supervision of J. R. Ummel, head of the Seattle Office, Alaska Division, United States Department of the Interior, and was designed by H. C. Hanson, well known Northwest naval architect, with headquarters in Seattle. She has the following principal dimensions:

Length overall 55 ft.
Beam 14 ft.
Depth 7 ft.
Loaded draft 5 ft. 6 inches

Built along lines similar to the Pacific Coast heavy duty workboat and fishboat types, she has 2-inch Douglas fir planking and a solid one-piece Douglas fir keel. She is sheathed with ironbark above and below the waterline for working in ice and has a canvas covered deckhouse and pilothouse and wide caulked wood deck with extra guard rail outside for working inshore.

Her hull is arranged with chain locker forward, followed by two steam-heated drying closets and sleeping quarters for a crew of four; then the engine room space and the officers' quarters. The deck house contains a roomy galley, messroom, and the pilot house forward. There are two transom berths in the pilot house and two in the mess room.

Forester is fitted with a bronze rudder and a bronze 3-bladed propeller on Tobin bronze shafting. This propeller is driven directly by an 80-horsepower Atlas-Imperial 4-cylinder, diesel engine of the fully enclosed yacht type, with pilot house control. She easily maintains a speed of 9½ knots.

By careful layout and wise selection of auxiliaries the designers of this craft have produced a power plant very suitable for year-round operation on the Alaska coast. The auxiliary compressor is an Atlas gasoline-engine-driven unit. The generating set for lights and auxiliary motors is a Robins and Meyers gasoline-driven and is complemented by a 25-cell Edison A.6 storage battery. The fire and bilge pump is by Moran.



Motorboat Forester on her trials. This sturdy craft is powered with an 80-horsepower Atlas diesel. She easily maintains a sea speed of 9½ knots.

Safe, adequate heating is assured by an Arcola Ideal oil fired plant. A Lux carbon dioxide system protects the engine room from fires. Standard plumbing fixtures are used throughout. Sanitary drainage is taken care of by a patent sump tank under the engine room grating, which, when full, is discharged automatically by compressed air. Two 400-gallon fuel oil tanks are installed. A Shipmate range, fitted with a Ray fuel oil burner, is installed in the galley. The galley houses also a large Copeland automatic refrigeration cabinet with machinery in the engine room below. Fresh water is carried in two 200-gallon tanks.

All cabins and deck house interiors are finished in white enamel and teak trim and all deck fittings are of polished brass. An American Engineering Company capstan and windlass, driven through enclosed worm gear by a 1½-horsepower Westinghouse motor, is fitted on deck forward.

A 16-foot copper riveted dinghy built by Mojean and Ericson is carried on the raised deck aft.

The Forester was taken north by Lyle M. Blodgett of Ketchikan and had a very good trip, arriving at Ketchikan on May 16. She will be based at Juneau.



Motorship North Star on her trials, Puget Sound.

Motorship North Star Delivered

*New Wooden Passenger and Cargo Vessel Enters Alaska Service
of the United States Government*

NORTH STAR, a wooden motorship, built by the Berg Shipbuilding Company, Seattle, to the designs of W. C. Nickum, Seattle naval architect, has now been for some weeks in Alaska service of her owners, the Bureau of Indian Affairs of the United States Department of the Interior. Drawings of this vessel and a complete description were published in the April issue of Pacific Marine Review.

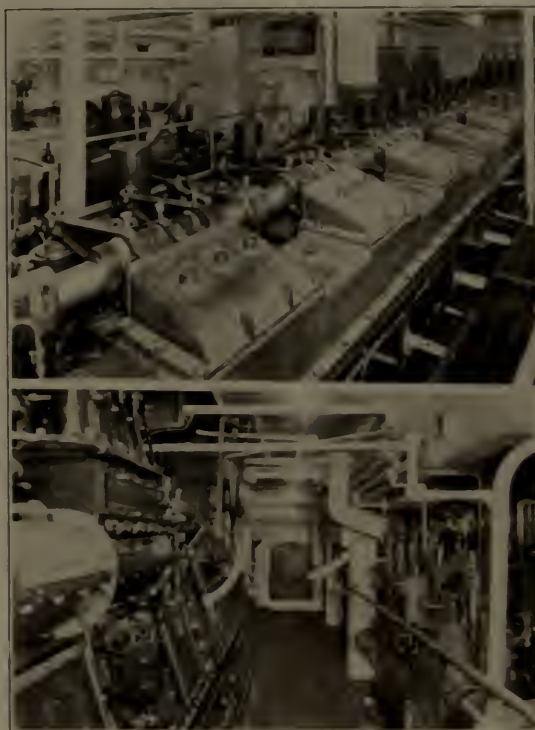
Her main characteristics are:

Length over-all	225' 0"
Beam over guards	42' 0"
Depth molded	21' 6"
Load draft	18' 6"
Cargo capacity, tons	1250
Shaft horsepower	1500
Sea speed loaded, knots	11

North star is propelled by a Coolidge 3-bladed bronze screw of 9 feet 1½ inches diameter and 7 feet pitch. This screw is direct-connected to a 10 cylinder, trunk piston, fully reversible, mechanical injection, 4-cycle, McIntosh & Seymour marine diesel engine developing 1500 brake horsepower at 210 revolutions a minute. Power for auxiliaries and lighting is provided by a 4 cylinder, 4-cycle, 110-horsepower, Atlas-Imperial diesel driving a 75-kilowatt General-Electric generator.

Quarters are provided for 28 first class passengers, for 28 crew, and for 20 steerage passengers. Large hold space is arranged for general cargo, and a refrigerated space for the transportation of frozen reindeer carcases. Oil bunkers carry enough for 48 days' cruising.

On trials, the machinery functioned satisfactorily, meeting the guaranteed over-all consumption of 0.45 pound per shaft horsepower hour by a safe margin and driving the hull on her trials at better than 13 knots. All bells to engine room from the bridge were promptly answered by the main engine and the officials of the Department of the Interior were well satisfied the North Star and her power plant would have no difficulty in navigating and maneuvering among the tortuous inlets and passages along the Alaska Coast.



Two views in the engine room of the motorship North Star. Above: Upper grating showing the valve mechanism of the McIntosh & Seymour engine and, in the background, the installation of Lux carbon dioxide cylinders. Below: Operating platform shows, at left, the control station of the McIntosh & Seymour propulsion engine and, at right, the Atlas Imperial-General Electric generating set.

Synchronous Signalling for Distance

THE problem of finding the distance of a ship from shore by timing the arrivals of simultaneously created signals in different media dates back to a period before the practical realization of the idea was possible.

More than 100 years ago, in the year 1826, two scientists, Colladon and Sturm, carried out an experiment to determine the velocity of sound in water at Lake Geneva between two boats moored a known distance apart. A bell was struck in the water and simultaneously a charge of gunpowder was exploded in the air. At the farther boat, an observer noted the time interval elapsing between the appearance of the flash of the powder and the sound of the bell as transmitted through the water.

Development of Distance Finding

Later, in 1911 and again in 1917, this method of distance finding was made the subject of extensive tests and practical trials by the United States Navy in co-operation with the Lighthouse Service. These tests demonstrated beyond doubt that this method was capable of practical realization.

Among the first abroad to recognize the tremendous possibilities of distance finding and the advantages to be obtained was Professor Joly of Dublin University, who, as a Commissioner of Irish Lights, was led to make a special study of navigational problems. As a result of his studies, he published a most interesting paper on "Synchronous Signaling in Navigation." This paper was published, to use his words, "with the hope that it might assist in promoting a reform in our system of maritime signaling."

The first practical step taken toward introducing the system abroad was a demonstration given by the Submarine Signal Company in August, 1921, to a special committee of Trinity House. This trial demonstrated fully the accuracy of distance finding by means of radio and submarine signals, and the committee were greatly impressed with the value of synchronous signaling to navigation.

The accuracy and reliability of this method of distance finding have been demonstrated by the United States Coast and Geodetic Survey which, in recent years, has adopted radio acoustic synchronous signaling as a most exact and expeditious method of fixing the position of soundings beyond the range of visibility of shore objects or during hazy weather.

In this country, on October 1, 1923, Nantucket Light-vessel was equipped by the Lighthouse Bureau with synchronous radio and submarine signals for distance finding. Later, as the lightvessels along the coast of Europe were equipped with submarine oscillators, these installations were combined with radio in order to give distance by synchronous signals.

The Principle of Distance Finding

Distance finding by synchronous signaling is based on the fact that disturbances travel with different speeds in different media. The method of distance finding utilized in the distance finding apparatus of the Submarine Signal Company utilizes the difference in the velocity of propagation of radio waves and sound

waves. Radio waves travel with a velocity equal to that of light; i.e., 186,000 miles a second. Therefore, the time required for their propagation over a distance of ten, twenty, or thirty miles is negligible. The underwater sound waves, on the other hand, have a velocity of only about 4800 feet per second; and, therefore, a measurable time elapses while the sound waves are traveling over the same distance. If therefore, a radio signal is created simultaneously with the submarine signal emitted by a submarine oscillator, and the time elapsing between the arrivals of the radio signal and the submarine signal is measured, definite knowledge is obtained of the distance of the listener's ship from the lightvessel at which the synchronized radio and submarine signals are produced.

To make available this most important aid to navigation, it is necessary that lightvessels should be equipped for sending synchronized radio and submarine oscillator signals. Twenty-eight such stations are today in operation and more equipments are being authorized for installation each year.

An Aid to Navigation

The most commonplace, and often one of the most urgent, of the problems which confront the mariner is the determination of his position upon approach to the coast. In fact, the determination of latitude and longitude at any time is primarily in preparation for that stage of the voyage when the ship draws near land. The special difficulties sometimes attending the solution of this problem are well known to those who have endeavored to locate a lightship in stormy weather or in the calm obscurity of fog. It has been the universal custom of Lighthouse Authorities throughout the world to supplement the lights at danger points along the coast by fog horns, whistles, sirens, and similar sound producing devices so that when the lights are invisible, owing to thick weather, these warning signals can be heard and notice thus be given to the mariner that his ship is within the vicinity of the danger point.

The fog horn in times of obscured vision is not, however, the equivalent of the light in clear weather for it does not enable the mariner to determine with reliability either the direction of, or the distance to, the lightship. In other words, the fog horn does not provide reliable information as to the position of the ship with relation to the danger point marked by a lightship. One reason for this is that sound signals produced in air are very erratic in their range and intensity, so much so as to be, on many occasions, absolutely misleading.

Aerial Sound Signals

Distance finding by synchronous signaling has, however, in the past few years, been extended to the synchronization of the radio and fog horn signals in a number of instances. The reliability of this system is limited, however, by the effectiveness of the fog horn itself. On the other hand, when the fog signal can be heard this method of distance finding proves very useful, especially at moderate ranges.

In 1929 one of the Submarine Signal Company's Electric Air Oscillators was placed in operation at Cape

(Please turn to Page 282)



Marine Equipment

NEW WATER METER ~ AUTOMATIC FIRE HERO
IMPROVED TACHOMETER ~ TEMPERATURE SIGNAL

Lifeboats on Oceanic Liners

MARIPOSA and Monterey are equipped throughout with life-saving equipment built by the Welin Davit & Boat Corporation. The equipment on each ship comprises fourteen 30-foot, 70-person lifeboats, four 26-foot, 40-person lifeboats, which are nested inside four of the 30-foot boats, two 20-foot wooden lifeboats, and two special 27-foot radio-equipped steel motor lifeboats. All of these boats are handled by Welin Maclachlan gravity davits, with the exception of the two 20-foot boats, which are handled by Welin quadrant davits.

The lifeboats are built of heavy gauge copper-bearing steel and are fitted with Mills releasing gears. The very latest type of gravity davits are installed, designed especially for these ships. These davits have many unusual features, such as the ease of control. One man alone is all that is required to release the grips and lower any of the lifeboats. As the lifeboats are lowered by gravity, no mechanical or manual force is used. The trackways down which the cradle carrying the lifeboats rolls extend below the boat deck to the promenade deck and thereby form very efficient 'tween deck supports. Therefore, the gravity davit, instead of setting up stresses as the ordinary mechanical davit does, actually strengthens the ship's superstructure.

As the lifeboats are stowed seven feet above the deck, clear deck space is always available for the use of passengers. The boat deck being the coolest place aboard ship,



Boat deck on the Oceanic liner Mariposa showing method of handling the lifeboats on Welin-Maclachlan gravity davit.

this feature is much appreciated during tropical voyages. The boats are returned quickly to their stowed position on the boat deck by a very efficient worm geared patented winch. The motors, controls, and limit switches were supplied by the Westinghouse Electric & Manufacturing Co.

The two 27-foot motor lifeboats on the vessels are the last word in life-saving equipment. These boats are propelled at about 8 miles per hour by 18 horsepower standard motors with electric starters. They are fitted with radio transmitting and receiving apparatus, designed and built by the Radiomarine Corporation of America and installed at the Welin plant.

Boats and radio equipment were tested in New York Harbor before shipping and contact was established with stations located

more than two hundred miles away. Amidship there is a substantial cabin in which are located the engine and radio equipment. No difficulty was experienced in operating the radio while the gasoline engine on the boat was running. The antenna is mounted between two folding masts, fitted fore and aft.

Other equipment on these motor lifeboats includes a Sperry searchlight, which can be used for signalling; a Morse lamp for signalling by flash light; an electric siren; and electric cabin and running lights. An Exide battery, with capacity to take care of 48 hour service, is installed to supply power for this equipment. A charging panel is installed so that these batteries may be kept fully charged from the ship's main circuit.

These boats are said to be the most fully equipped lifeboats afloat.

Automatic Hero for Fire Crises

AN automatic fire hero was publicly demonstrated for the first time on May 9 to delegates at the annual convention of the National Fire Protection Association in Atlantic City. The hero is a system of apparatus which plays the part of the man who keeps cool and knows just what to do in an emergency.

The system serves as a fire alarm that avoids alarming anybody. It automatically detects a fire and then forces the fire to announce itself in a human voice which calmly warns people, instructs them how to leave a building, and starts a band playing to help them march out quietly.

The apparatus has just been perfected by engineers of the Western Electric Company working in conjunction with the Garrison fire detecting system. Besides the unusual technical features of the apparatus, the use of a voice and a band instead of the traditional fire gong is based on the findings of modern psychology as to the way people react both to emergencies and to different kinds of sound.

By means of electrical devices, the system combines an automatic fire detector with a music reproducer which is connected to loudspeakers. In the demonstration at Atlantic City, a small flame is placed near the fire detector. A few seconds later the detector responds in three ways. It sends an alarm straight to the fire house, directing the firemen to the side of the building nearest the fire, while in front of the building itself an arrangement of lights shows them in what particular part of it the fire is located. At the same instant, the music reproducer commences playing and is heard over loudspeakers. Thirdly, green arrows light up, pointing out the correct route for exit.

The record, designed in this case for use in a school, begins with a flare of trumpets, followed by a distant siren. Then a calm but commanding voice says: "There is a fire emergency but no immediate danger. You must leave the building. You are drilled in this and know just what to do. Leave your hats and coats, take your places in line. Steady now, don't rush. Follow the green arrows." A brass

band strikes up a martial air and the sound of approaching sirens is heard through the music.

Everything in the record has a definite purpose. The band piece was chosen for its strong marching rhythm. The siren is injected to accustom the children to it in drill so that they will not be frightened when they hear the real thing for the first time. Fire chiefs recommended the command to abandon hats and coats as experience shows they are likely to be dropped, causing others in the line to stumble.

The automatic fire detector uses special wiring which is sensitive to heat. The core is a fusible alloy enclosed in a steel sheath which is slit along its entire length. At 160 degrees Fahrenheit the alloy melts and expands forcibly. It spurts through the slit and, making contact with an outer metal sheath, causes a short circuit that sets off the alarm. In actual installation, this wiring is placed throughout a building and a very small current, enough to spring the alarm, is kept flowing through it.

In the Western Electric Sound System that is used, the music reproducer is associated with an amplifier which may be connected to loudspeakers of any size placed in any number of rooms, hallways, and auditoriums. The apparatus is "electrically supervised." A small current, about equal to that consumed by an ordinary 60-watt electric light bulb, keeps the amplifier tubes warm and ready to operate instantly, and also notifies the local technician should the slightest misadjustment occur. All the vital apparatus in the system is protected in a fire-proof vault.

"The bell or gong of the traditional fire alarm," said William Lindsey, president of Garrison Fire Detecting System, "actually alarms and frightens people, but does not tell them what to do. Modern study of the effect of sound shows that clamorous sounds of that kind even in the absence of an emergency tend to make people feel excited and lose their heads. That is just the thing to avoid in an emergency.

"Most of the classic stories of heroism at fires tell of the man who kept his head, who calmly issued commands that were sensible and compelling. He is the man who ordered the band to keep playing. You can't count on having that kind of a man on hand every time! But you can coolly and deliberately plan the

best commands to give and the best way to give them and put those out to a record. Couple this with an electrical fire warden who stands guard in every room of a building every minute of the day and night ready to save the first precious minutes in discovering a fire, and you find that science has constructed a mechanical hero who can be present at every fire."

The automatic fire detector employing the more familiar types of alarm has, according to Mr. Lindsey, been in use for some time. The first installation was made in 1927 in the George Washington home in Mount Vernon. In no case have fires progressed far enough to need the use of fire hose. They have been detected quickly enough to be put out by hand extinguishers. No human being has been injured and property damage has never exceeded \$50.

The application of this idea to prevent panics in fire emergencies at sea is obvious.

New Model Water Meter

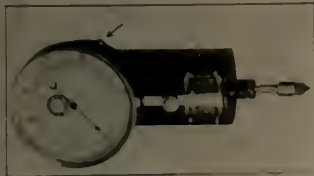
HAVING commercially manufactured various types of water, oil, gasoline, and grease meters for the past 75 years, the Worthington Pump and Machinery Corporation recently has added another model of water meter to its already extensive line. This meter, known as the Model GA, is said to be the most accurate yet developed for extremely low flows as well as for intermediate and high flows. Built in sizes from 5/8 to 2 inches, with normal flow limits from 1 to 160 gallons per minute, these new meters incorporate many unusual features.

Of the positive displacement disk type, all register gears are fitted with rubber-bushed bearings. The register box, of heavy construction, is fitted with a double lid to facilitate cleaning of the cover glass. The train assembly comprises four cast bronze gears and four pinions, all rigidly fastened to monel metal spindles which revolve in replaceable hard-rubber bushings. Although standard construction provides an enclosure for oil, the train easily may be converted to the open type by the substitution of an open train plate—removal of three screws releasing the train from the main case.

The disk or measuring chamber is in two sections, held together by a snap joint without screws. This construction permits the case to separate without distortion in the event of freezing. Additional protection is secured by the use of a cast-iron frost bottom on the three smaller meters. Though sufficiently strong to withstand the pressures encountered in regular service, this bottom breaks when the water in the meter freezes. This relieves the strain on the interior parts and prevents damage to the meter. Replacement of the bottom at nominal cost makes the meter again ready for service.

A particularly interesting feature of these new meters is the location of the stuffing box. This is cast on the main case instead of being a part of the train or register box. This eliminates a source of possible leakage as no gaskets or lock nuts are necessary.

Though sufficiently accurate to record small drips and slow unseen leaks — an appreciable loss not recorded by the ordinary meter — this new meter is a sturdy instrument that will give long, reliable, and efficient service with a minimum of wear, corrosion, and maintenance.



New Model Anthor tachometer.

Fixed Reading Hand Tachometer

A NEW hand tachometer for testing rotating speeds has just been put out by the Anthor Testing Instrument Co. This new speed tester simplifies and further facilitates the testing of speeds of rotating machinery on shipboard.

An important new feature in its construction is the automatic fixed reading, whereby each time that the instrument is used the pointer remains fixed on the dial at the exact speed reading. While it is being held to the engine or motor, the tachometer instantly points out the speed and also shows every pick-up or slow-down, no matter how small these variations may be.

The fact that the readings are automatically fixed on the dial allows the instrument to be used in the dark if necessary, or in tight places where it is awkward to hold and read the dial at the same time.

Unlike an ordinary marine tachometer, this new hand type is used primarily for portable testing and is constructed for this purpose. It has a fine cross-pendulum governor movement, is hand calibrated for accuracy and dead beat in action. Various ranges can be had to directly measure speeds up to 12,000 revolutions per minute. This new model is known as Anthor Type No. 350.

Automatic Electric Temperature Signal

A TEMPERATURE signal device for determining temperature by means of electric lights and known as the Thermo-Tel has been developed by the Uehling Instrument Company.

This instrument consists of different colored electric lights, actuated by changes in temperature. When the temperature is within the limits for which the instrument is set, a white light will illuminate; when the temperature is above the limits, a red light will illuminate; and when the temperature is below the limits, all lights will be out.

Each Thermo-Tel signal is set for the particular limits desired. For example, 190 degrees and 193 degrees. A glance at the colored lights will definitely determine whether the temperature is high, low, or within said predetermined limits. If desired, the signaling lights may be located at any distance from the

temperature which is being observed.

Thermo-Tel Temperature Signals are claimed to be accurate to within less than one tenth of one degree Fahrenheit, and can be read at a distance of two hundred feet or more.

Improved Type Viking Pump

A VIKING Rotary Pump with a new type of drive has been developed by the manufacturers. This new model is especially adaptable for marine use as the floor space, due to the compactness of the outfit, is very small. For the amount of work this pump will handle the weight also is very small.

As you will see by the illustration, the pump is direct-connected to a geared head motor. The gears running in oil eliminate noise almost entirely, and are dust-proof and water-proof.

This new Straitline model is made in sizes ranging from 10 to 450 gallons per minute.

Vikings are positive pumps, can be operated in either direction, and pump any liquid which flows. The Straitline is designed to accept any standard make of geared head motor. Another optional feature is a relief valve or by-pass valve built into the head, which saves manifolding and expense of attaching.

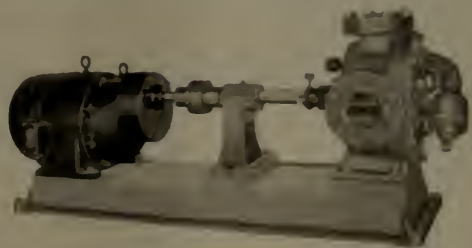
Summarizing the features of this Viking Straitline model, it is neat and quiet, has a wide range of operating speeds, occupies small space, has great flexibility in diversified installations, has a simple compact relief valve arrangement, and, of great importance to the marine field, is light in weight.

The complete line of Viking pumps is handled on the Pacific Coast by the De Laval Pacific Company, 61 Beale Street, San Francisco, with a full stock of pumps and parts and with service available at all major ports.



At left, new Uehling Thermo-Tel.

Below, New model Viking Pump.



Electrode Holder

Saves Power

A NEW electrode holder stand which automatically shuts down the welder one minute after holder is placed on the stand and instantly starts the welder when the holder is removed is announced by The Lincoln Electric Company. It is known as the Lincoln Power Saver.

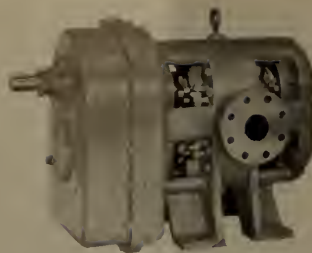
It is claimed that the automatic start-and-stop feature of the new stand effects a decided saving in power consumption. Heretofore it has been common practice to let the welder run continuously during working hours even though the operator might actually be welding only intermittently.

Operation of the stand is extremely simple. When the hook is depressed by the weight of the holder it activates a special timing device which, at the end of one minute, disconnects the welder from the power supply line. When the holder is removed from the hook the welder starts automatically.

The stand is of arc welded steel construction throughout. Its broad, heavy base provides ample rigidity, yet does not impair its portability. The holder hook can be raised or lowered on the upright member to suit the convenience of the operator. Fifteen feet of rubber-covered, two-conductor cable is provided with the stand for connection to the welder. The Power Saver can be used whenever the welding equipment is provided with an automatic motor starter having two wire pilot control.

Cycloid Type Northern Pump

A NEWLY developed line of rotary pumps, known as the Cycloid Type, has been introduced by the Northern Pump Company into the marine and industrial fields. A recently published bulletin NH² describes and illustrates these new pumps, giving data and dimensions on four of the new series, namely FNH, KNH, LNH, and BNH, with capacities from 50 to 750 gallons per minute and pressures up to 500 pounds. Cycloid Type pumps are designed for water, gasoline, oil, or any liquid. The word cycloid has particular reference to the shape of the cams or impellers. They are of



Typical Northern pump of the new Cycloid type.

more simplified construction than the standard Northern four-lobe impeller design. Complete automatic machinery has been installed to produce them on a quantity basis which will allow them to be sold at a lower price than former types.

Among the numerous new distinctive features of the Cycloid Type are: extra large stainless steel shafts, better to carry the loads on continuous duty service; liner plates that are reversible and which can be of any metal (bronze plates are installed on standard pumps unless otherwise specified); new type packing glands that are accessible, making packing replacement a simple matter; automatic gibs or wipers that can be replaced without tearing down the entire pump (simply by removing the back cover); built-in gear reduction (spur, herringbone or helical); and over-size ball bearings which cannot encounter the liquid being pumped.

The pump as a whole is much more compact and lower in height than the old type, and the elimination of the separate suction base and the provision of a straight through passageway for the liquid makes piping installation easier. In short, the same pumping capacity has been retained, while the unit has been simplified and reduced greatly in size and weight.

The Northern Pump Company is represented on the Pacific Coast by the De Laval Pacific Company, 61 Beale Street, San Francisco. George Stoddard is department manager and secretary.

Licencees.—The Babcock & Wilcox Company has been granted the exclusive rights in the United States and Canada for the manufacture and sale of the automatic pressure-circulating and indirect heating system of sulphite cooking developed by the Kimberly-Clark Corporation.

Trade News

Pillsbury & Curtis To Represent Federal.—The firm of Pillsbury & Curtis of San Francisco has been appointed sales representative for the Federal Composition and Paint Co., Inc., of New York, the appointment effective as of July 1.

Pillsbury & Curtis' organization has been actively identified with Pacific Coast shipping for twenty years, both in engineering and operations.

Federal marine paints are manufactured from carefully prepared formulas, and the production is supervised by a technical staff. The line includes antifouling, anticorrosive, boot-topping, cabin paints, copper paints, deck paints, deck house paints, hold paints, red lead (mixed), smoke-stack paints, and top-side paints. Stocks are maintained at all principal ports in the world.

Cordage Distributor.—The Waterbury Company of New York has completed arrangements with the Seattle Marine Supply Company of Seattle, Washington, whereby this firm becomes exclusive distributors of Waterbury Cordage Products in Washington, Oregon and Alaska. The Seattle Marine Supply Company is an outgrowth of the Seattle Hardware Company, a pioneer concern in the Northwest, having been established in 1883, and carrying on a general ship chandlery business.

Al Hollingsworth, manager of the Seattle Marine Supply Company, was formerly manager of Weeks Howe Emerson Company of Seattle, which business was purchased by Seattle Marine Supply Company. Hollingsworth has had a wide experience in the marine business and is highly enthused with the possibilities offered through the Waterbury connection. Complete stocks of Waterbury Cordage Products are now available.

Elected Vice-President. — J. S. Tritle has been elected vice-president in charge of operations of the Westinghouse Electric Supply Company, wholesale distributor of Westinghouse products to electrical dealers, contractors, and industrial establishments. He will assume his new duties immediately in addition to his present position as vice-president and general manager of the Westinghouse Electric and Manufacturing Company.



American Shipbuilding

Edited by H. C. McKinnon

Swayne and Hoyt Contract.—The Craig Shipbuilding Company of Long Beach, California, has been awarded contract for the reconditioning of exhaust turbine machinery and the reconditioning and outfitting of accommodations for eight passengers on the Swayne and Hoyt steamers Point Ancha and Ossining.

The work specified on passenger quarters includes the reconditioning of four rooms, each of which will be nicely finished in Vehisote paneling and will be furnished with two Simmons berths equipped with Simmons Beautyrest mattresses. Cold fresh water will be piped to wash basins in each room, and a full complement of chromium plate toilet accessories will be installed, including an ivory finish toilet cabinet with beveled plate glass mirror; a plate glass shelf; two drinking glass holders; two towel racks; thermos bottle; and hook for razor strap. A mahogany dressing table, two chairs, and a settee form the furniture of these rooms. A wash room for men and one for women are piped with hot and cold fresh water and cold salt water, fitted with ceramic tiled floor; equipped with Standard plumbing fixtures including tub and shower baths. The dining room will be re-furnished and reconditioned with Vehisote paneling, mahogany trim, mahogany furniture, and rubber tile flooring.

The machinery units to be installed are: A Westinghouse type exhaust turbine in one ship, and a Bauer-Wach type exhaust turbine, manufactured by the De Laval Steam Turbine Company, in the other. In connection with these propulsion machinery units, there will be installed in each vessel the following: A lubricating oil system for the turbines, including coolers, strainers, tanks, suitable valves, Tycoos thermometers, and a De Laval oil purifier; a new condensing system by Westinghouse, including condenser and air ejector. De Laval, Westinghouse, and Worthington pumps.

Condenser tubes are to be packed

with John Crane metallic packing. Gauges are to be Ashcroft. The boilers are to be equipped with Babcock & Wilcox convection type super heaters, with Bailey steam flow meters and with Bailey feed water regulators.

The guarantees on these exhaust turbine installations are specified to be that the turbine will "develop 1075 shaft horsepower when receiving 40,000 pounds of steam per hour with 6.7 pounds absolute pressure at the steam inlet and not exceeding 8 per cent. moisture and exhausting at 28 inches vacuum" (equivalent to 0.944 absolute pressure). The revolutions of the turbine rotor are not to exceed 3600 per minute. The line shaft speed is 95 revolutions per minute.

The present power plant is the standard United States Shipping Board 2800 indicated horsepower triple expansion engine which produces approximately 2500 shaft horsepower. With its low pressure cylinder exhausting into the turbine against 6.7 pounds absolute pressure, or approximately 16 inches vacuum, the shaft horsepower developed by the reciprocating engine is apparently reduced to 2160, since the combined shaft horsepower of turbine and reciprocating engine is given as 3235. This indicates a net gain of over 700 horsepower, or 28 per cent. on practically the same steam consumption.

A mail contract in connection with these ships demands a sea speed of 12 knots. It was first thought that in order to obtain this speed the hulls would have to be lengthened and the stern changed in addition to having this added power. Marine engineers and naval architects now estimate that a speed of 13 knots can be obtained with the added power assisted by contrapropellers and streamline rudders and with no change in the hull. On this basis, Swayne and Hoyt, Ltd., are going ahead with the machinery installation and wisely avoiding, if possible, the always costly structural changes to hull.

Contract for River Boat.—Contract for the construction of the stern-wheel river steamer for the Alaska Railroad has been awarded to the Berg Shipbuilding Company of Seattle by the Department of the Interior. Bids were opened the first of June at the office of the Consolidated Purchasing and Shipping Unit, Bell Street Terminal, Seattle, in charge of J. R. Ummel.

The bids were as follows:
Berg Shipbuilding Co., Seattle,
..... \$131,226.60
Seattle Marine Construction,
..... \$169,750.00
Maritime Boat & Engine Works,
Seattle \$175,000.00
Martinovich-Anderson & Cosulich,
..... \$168,894.80

*With additional charge of \$8500 covering Nordberg engine and \$10,000 additional for Skinner-Unaflo engine. Berg Shipbuilding Co. also quote extra charge for Nordberg and Skinner Unaflo engines.

The boat is of special design for operation on the Yukon and Tenana Rivers in Alaska and is to be of wooden construction and powered by two tandem compound engines driving the stern wheel. Heavy duty, iron, fire-tube, locomotive type boiler with a large fire-box and furnace front especially designed for burning wood fuel will supply steam at 200 pounds pressure. Her general characteristics are: 235 ft. length over-all; 210 ft. between perpendiculars, 6 ft. depth, 3 ft. 6 in. draft.

Further particulars will be found in the June issue of this magazine, with outboard design of the vessel.

Ocean-River Barge Planned.—The Stevens Shipping Company of Savannah, Georgia, is reported to be planning the construction of an ocean-going type of self propelled barge of sufficiently shallow draft to navigate also the Mississippi and Ohio River systems. It is said the plan contemplated by the company is to move cargo direct from Savannah to St. Louis, Cincinnati, and possibly into Chicago via the Lakes-Gulf waterway.

Bids Asked on Reconditioning Tug.—Bids were to have been opened June 27 at Fort Mason, San Francisco, for the reconditioning of the powerful towboat Slocum and conversion of the boilers from coal to oil burning. The Slocum is operated by the Quartermaster Corps of the United States Army at the Port of San Francisco. She is 165 ft. length, 29.3 ft. breadth; 18 ft. depth, with single screw, and powered by triple expansion steam engines. She was built in Philadelphia in 1898. The job is estimated to cost about \$30,000.

To Convert Vessel.—According to advices from Seattle, the motorship Aleutian Native has been sold by the Kanaga Ranching Company to the Petroleum Navigation Company of Seattle, and the latter firm will convert the vessel into an oil tanker for operation on Puget Sound distributing oil to various ports. Principal members of the petroleum firm are Frank Edwards, former mayor of Seattle, Frank Edwards, Jr., B. Gronbold, and Roy M. Eidal. The vessel is 117 ft. long of 242 tons gross and 154 tons net. She was built by the Kanaga Ranching Company as a supply vessel for its fox farms in the Aleutian Islands.

Remodeling Vessels.—Grace Lines, Inc., with Pacific Coast headquarters at San Francisco, is engaged in a program of remodeling its six steamers in the North Pacific-South America service.

The first vessel, the Coya, is now under going reconditioning and will return to service about July 1. The other vessels of this service scheduled to receive improvements are: Capac, Charcas, Carique, Cuzco and Condor.

Contract for the work has been let to the Hicks-Bull Machine Company of Tacoma, Washington. Passenger accommodations will be augmented. Those ships now having facilities for eight in first class will be equipped to accommodate 12, those carrying 16 will be equipped to accommodate 20. In addition, third class quarters for 20 persons will be installed in each vessel. Other reconditioning will include improvements to the cargo handling and stowage facilities and propulsion plant to increase their fitness for the long Pacific Coast itinerary, and the enlargement of cold storage spaces.

Plans for Army Barge.—Bids

were scheduled to be opened the end of June for the construction of an all-welded steel barge for the Quartermaster Corps of the U. S. Army, Washington, D.C. The barge is to be electrically welded and is to have dimensions 44 ft. length, 18 ft. beam, 4 ft. 6 in. depth. The craft was designed by Frank Van Vleck, supervising marine engineer, office of the Quartermaster General at Washington. It is to be used at the Panama Canal Zone. This is the third craft ordered by the Quartermaster General to be built on the all-electric-welded plan.

Santa Paula Launched.—Preceded by an elaborate pageant, the steamship Santa Paula was successfully launched into the Hackensack River at the plant of the Federal Shipbuilding & Dry Dock Company, June 11. This is the second of four fine new vessels building at this plant for the Grace Lines-Panama Mail Service which will be operated between California and New York, via Mexico, Central and South America, and Havana, giving a 16-day service.

The pageant represented a re-enactment of a launching in the clipper ship era, and the ship represented was the Sovereign of the Seas, which was launched 80 years ago last month for the California trade. Fifteen of the outstanding figures of the clipper ship era with their wives at the christening ceremonies were portrayed. These included Donald McKay, builder of so many famous clippers; William Aspinwall, founder of the Pacific Mail Steamship Company and co-operator in the building of the Panama Railroad; Commodore Cornelius Vanderbilt who established the Auxiliary Transit Company; and Moses H. Grinnell and Robert Minturn, owners of the Flying Cloud and other McKay clippers. The pageant dramatized the evolution, step by step, of the fast freight and passenger service between the Atlantic and Pacific seaboard of the United States by the water route.

Following the pageant a number of prominent speakers addressed the thousands gathered to do honor to this occasion. These included: Representative A. M. Free of California, Dr. L. S. Rowe, director-general of the Pan-American Union; and L. H. Korndorff, president of the Federal Shipbuilding & Dry Dock Company. The sponsor of the Santa Paula was Mrs. Edward T. Ford of San Francisco, wife of the

president of the Panama Mail service of the Grace Lines, Inc.

New Rules for Marine Boiler Inspections.—According to an announcement made last month by the Department of Commerce, new regulations covering material specifications and the design, construction, and inspection of boilers, pressure vessels, and their appurtenances used in the propulsion of steam vessels is to be issued shortly by the Steamboat Inspection Service. According to a statement by Dickerson N. Hoover, Supervising Inspector General, the radical changes and developments in this field of engineering necessitates modification of the rules under which these equipments are classified.

Quirigua Completed.—The second of the three vessels building for the United Mail Steamship Company by the Fore River Plant of the Bethlehem Shipbuilding Corp., Quincy, Mass., has been delivered to her owners and sailed from New York, June 8, for Caribbean ports, in which she will see regular service. The vessel will call at Port Everglades, Havana, Kingston, Cristobal, Port Limon. Captain Harry Spencer has been appointed master.

The Quirigua was launched February 6, last, and is identical to the steamship Antigua, described in detail on page 257 of this issue.

Keel Laid for Towboat.—The keel was laid May 9 at the Great Lakes Engineering Works, River Rouge, Mich., for a new powerful, diesel-electric tug ordered by the Ford Motor Company. The new vessel will be 85 feet long and is being built from designs drawn by Henry J. Gielow, Inc., and will be completed by July 1. The tug is to be of all-steel construction and will carry a pair of 330-horsepower Cooper-Bessemer diesel engines operating on a single 500-horsepower electric drive motor. The vessel will be used only on the Great Lakes.

New Submarine Commissioned.—The U.S.S. Dolphin, newest submarine of the United States Navy, was commissioned June 1 at the yard of the builders, the Portsmouth Navy Yard, Portsmouth, Va. The Dolphin is assigned to the submarine division on the Pacific Coast. She will be manned by six officers and fifty-two men and cost \$2,000,000.

(Continued on page 22, Adv. Section)

NEW SURVEY VESSEL FOR CANADIAN PACIFIC COAST

COLLINGWOOD Shipyards, Limited, Collingwood, Ontario, has recently completed the steamer Wm. J. Stewart, which was especially designed and built for the Dominion Government Hydrographic Survey Service on the Pacific Coast. She will be employed in charting the British Columbia coast and sounding the coastal waters to depths of about 1000 to 4000 fathoms, to outline the contours of the ocean bed, and provide navigational charts in the interests of shipping.

General dimensions are:

Length over-all	228'0"
Length between perpendiculars	214'0"
Breadth molded	36'0"
Depth molded	23'6"
Horsepower	1300
Speed, knots	12

The vessel has a cruiser stern and a slightly raked stem. The hull is of steel construction, subdivided fore and aft by nine watertight bulkheads.

A complement of sixty-six is carried, and special attention has been given to quarters for the surveying staff. On the main deck forward, the officer commanding is provided with a day cabin paneled in mahogany, a sleeping cabin, and special bathroom. Four large, well furnished staterooms with bath are fitted on the main deck and four on the lower deck for surveyors. On the upper deck is fitted a smoking room and a special office for the officer commanding. A dining saloon for the staff, paneled in oak, is provided on the main deck. In addition, there is an officers' saloon and petty officers' mess on the main deck aft. To complete the surveyors' staff, accommodation is fitted for four drivers and four coxswains. Crew quarters are provided aft and on the lower deck. Officers and engineers have special bathrooms. The chief, second, and third engineers and chief steward have separate rooms.

The quarters are steam heated throughout and are equipped with mechanical ventilation, with motor-driven fans. Galley and pantries are located on the main deck abaft staff accommodations. The vessel is also equipped with an up-to-date electrically equipped laundry, and with cold storage chambers of sufficient capacity to provide fresh stores for the staff and crew, in addition to



Canadian Hydrographic steamer Wm. J. Stewart, leaving the Collingwood plant for delivery at Victoria, a voyage of 8000 miles.

various shops needed to provide the upkeep of the vessel and the special requirements of the hydrographic staff.

Propulsion Machinery

The propelling engines and boilers were constructed by the builders. The engine consists of two sets of triple expansion engines having cylinders 13½ inches, 20½ inches, and 33 inches by 24-inch stroke, each having a separate condenser. Steam is supplied by two single-ended Scotch boilers, 13 feet diameter and 11 feet 2 inches long, working at 100 pounds pressure, with Howden's forced draft. These boilers are fitted, one ahead of the other; coal bunkers being arranged at the sides. Coaling is done through saddle back coal hatches on the upper deck, also eight coal scuttles. The thrust bearings are of Michell make, and Cutless Rubber Bearings have been fitted to the propeller struts.

Auxiliaries consist of two main air pumps, three feed pumps, feed heater, feed filter, evaporator, distiller, one emergency bilge pump, two centrifugal circulating pumps, one ballast and general service pump, one sanitary pump, and one fresh water pump.

The navigating equipment of this vessel is very elaborate, including wireless and radio broadcasting transmitters and receivers, radio direction finders, gyro- and magnetic compasses, loud speaking telephones, clear vision screens, powerful searchlights, and provision for echo sounding apparatus. In addition to the usual complement of lifeboats and service dories, she carries four 26-foot gasoline en-

gine driven launches especially fitted for survey work.

An elaborate workshop is fitted on the after end of the engine room, having a number of motor-driven tools.

Trials of the Wm. J. Stewart on the measured mile were carried out on May 18; and the ten hours endurance trial on May 19. The maximum speed obtained on the measured mile was 13.585 knots at 159.5 revolutions against the specified speed of 12 knots. On the progressive speed trials, 12 knots was obtained at 142 revolutions; 11 knots at 125½ revolutions; 9.585 knots at 108.7 revolutions; and 8.25 knots at 90.2 revolutions.

The vessel is built throughout to the special survey of the British Corporation Register of Shipping and Aircraft; also to the requirements of the Canadian Government Steamboat Inspection. The contract price for construction of this vessel is \$616,800. Keel was laid August 12, 1931; launching date was April 14, 1932; and her trials were on May 18 and 19. The vessel was designed by Chas. F. M. Duguid, naval constructor of the Department, while the builder was represented by John S. Leitch, vice-president and general manager.

Prince David.—The Canadian National Steamships steamer Prince David, which was badly damaged by stranding on a coral reef near Bermuda, has been floated by the Merritt-Chapman & Scott Corp. and towed to St. John's, New Brunswick. It is probable that the vessel will be repaired at a Canadian shipyard.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of June 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W. Seattle, Wn.
Not named, wooden hull, stern-wheel, river steamer for Alaska Railroad, Dept. of Interior, Bell St. Terminal, Seattle, Wn.; 235 L.O.A.; 210 L.B.P.; 6 ft. depth; 3'6" draft; 2 tan. comp. steam engs.; wood-burning boilers; 100 pass.; 300 tons freight.

GENERAL ENGINEERING & DRY DOCK CO., Oakland, Calif.

Purchasing Agent: A. Wanner.
Marshall C. Harris, hull 26, suction dredge for American Dredging Co., San Francisco; 150 L.B.P.; 45 beam; 12 depth; keel 11/23/31; launched and delivered 5/3/32.

U. S. NAVY YARD, Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 10/2/32 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD, Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31; deliver 2/11/34 est.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: Shell barge No. 9, stmr. Hegira, stmr. La Purissima, ferryboat San Diego, m.s. Hermosa, m.s. Ontariole, Pan Pacific derrick barge; stmr. H. F. Alexander, stmr. Chirigui, stmr. Admiral Halstead, barge A. T. No. 6, U.S.S. New York, stmr. Admiral Wiley, stmr. West Cusseta, stmr. Santa Eliza, stmr. Mericos H. Whittier, stmr. Manulani, stmr. Maui, stmr. Admiral Chase. Drydock, misc. repairs: stmr. Point San Pedro. Repair 3 lifeboats m.s. Silverbeech. Caulk leaking rivets in forepeak; stmr. President Wilson. One bronze propeller blade: stmr. Admiral Laws. Misc.: tug Sea Prince, m.s. Lio, m.s. Silveray, launch Costa Rica No. 1, stmr. Stanley Dollar, stmr. Nora, launch Oakland, U.S.A. transport U. S. Grant, stmr. Monterey, stmr. Chirigui, stmr. Antigua, stmr. Talamanca.

THE MOORE DRY DOCK COMPANY, Oakland, Calif.

Miscellaneous repairs and dry-docking: stmr. Crockett, Mahiko, Elwin C. Hale, Delta Queen, ferry Golden Shore, yacht Shawnee, stmr. Brunswick, Patterson, West Mahwah, Glacier, Chas. Nelson, Pulpit Point, R. M. Woodward, Golden Dragon, Willazo, Missouriian, Samoa, S. O. barge No. 2, Crowley carfloat No. 3, pilot ship Gracie S., ferry San Leandro, Santa Fe Barge No. 5.

PRINCE RUPERT DRY DOCK & SHIPYARD, Prince Rupert, B.C.

Docked, cleaned, painted, annual overhaul: stmr. Prince Rupert, D.G.s. Birnie. Docked, cleaned, painted, propeller repairs: m.s. Bellingham. Docked, cleaned, painted, broken tailshaft renewed, misc. hull and machinery repairs: m.s. Zapora. Docked, cleaned, painted, misc. hull and engine repairs: 5 fishing boats. Misc. hull and engine repairs not requiring docking: 19 fishing boats.

U. S. NAVY YARD, Bremerton, Wn.

Repairs and docking: U.S.S. Lexington, Saratoga, Neches, Talbot, Greer, Claxton, Elliott, Yarnall. Misc. repairs: U.S.C.G. c. Haida, Eagle No. 11 Eagle No. 32. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge. Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY, Pittsburgh, Pa.

Purchasing Agent: W. G. A. Millar.
12 barges for American Barge Line Co., Louisville, Ky.; 158 x 35 x 11 ft.; 182 net tons steel each; delivery July and August.

BATH IRON WORKS

Bath, Maine

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed; deliver 6/11/34 est.

Not named, hull 155, quarantine tug for U. S. Public Health Service, Boston; 60 ft. long; 15 ft. beam; 7 ft. depth.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington, D.C.; 131 long; 24'6" molded beam; 8'6" molded draft; 500 H.P. eng.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT, Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement; deliver 8/15/32 est.

Lurline, hull 1447, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; deliver Jan./33 est.

Quirigua, hull 1445, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 2/6/32.

Vergara, hull 1446, sister to above; launched 4/23/32.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed; deliver 2/11/34 est.

COLLINGWOOD SHIPYARDS, LTD.,

Collingwood, Ontario

Purchasing Agent: E. Podmore.

Wm. J. Stewart, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.; keel 8/12/31; launched 4/14/32; sailed from yard, June 5, for delivery at Victoria, B.C.

Repairs: Bottom damage: stmr. Manitoba.

DEFOE BOAT & MOTOR WORKS Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.

Not named, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W-T boilers; keel 12/15/31 est.; launch 4/15/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY, Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6".

Hull 1139, steel hull, 20-in. pipe-line, self-propelled, diesel-electric powered dredge for U. S. Engineers Office, St. Louis, Mo.

Hull 1140, same as above.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

ELECTRIC BOAT CO., Groton, Conn.

Cuttlefish, fleet submarine SS171 for U. S. Navy; keel 10/7/31; deliver 12/29/33 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32.

Santa Paula, hull 122, sister to above; keel 8/4/31; launched 6/11/32.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel 3/24/32.

GREAT LAKES ENGINEERING WORKS

River Rouge, Michigan

Empire, hull 279, dredge hull for Dumbar & Sullivan; 125 x 42 x 10 ft.; keel 4/4/32; launched 5/9/32 est.; delivered 5/31/32.

Not named, hull 280, diesel-electric tug for Ford Motor Co., Detroit; 75 L.B.P.; 2 beam; 12 loaded draft; 500 S.H.P.; keel 5/9/32; launch 6/11/32 est.; delivery 7/15/32 est.

HOWARD SHIPYARDS & DOCK COMPANY,

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Harriet Lloyd, hull 1700, one inspector
for U. S. Engineers Office, Kansas
City, Mo.; 138 by 30 by 5 ft keel 3 21/32;
launched 5/31/32; deliver 8/32 est.

MARIETTA MANUFACTURING CO.,

Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Captain William Clark, dredge, for
U. S. Engineers Office, Washington, D.C.;
240 x 9 x 8'6" launched; deliver 6/1/32

Ten covered cargo barges for Campbell
Transportation Co., Pittsburgh, Pa.; 132 x
38 x 10 ft keel 5/15/32 est.; deliver 7/1/32 est.

MIDLAND BARGE COMPANY, Midland, Penn.

Eight floating steel caissons for Founda-
tion Co. delivered.

One 15-ton derrick boat for U. S. En-
gineers Office, Huntington, W. Va.

No name, tunnel stern, stern-wheel, die-
seled towboat for Inland Waterways
Corp., Washington, D.C.; 160 by 50 by 8
ft depth; two 590 B.H.P. McIntosh &
Sisson diesel engs.

No name, same as above.

NASHVILLE BRIDGE COMPANY, Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Not named, hull 265, gas launch for
U. S. Engineers, Pittsburgh; 40 x 8 x 8 ft;
keel 4/27/32 launch 6/10/32 est.

Hull 766, 31 ft workboat for U. S. En-
gineers, Nashville, keel 6/1/32; launch
7/10/32 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90
Broad Street, New York City.

Columbia, hull 347, passenger and
freight vessel for Colombian Mail Steam-
ship Corp., New York, 404'3" L.O.A.;
57'6" beam, 31'6" depth; 16 knots speed;
steam turbine drive; 5200 gr. tons; keel
2/29/32, launch 8/32 est.; deliver 12/1/32

Harr, hull 348, sister to above;
keel 4/4/32 launch 9/32 est.; deliver
12/15/32 est.

Audubon, hull 351, comb. passenger and
freight vessel for Eastern Steamship Lines,
India Wharf, Boston, Mass.; 402'9" L.O.A.;
60 beam; 29'9" depth; 20-22 knots; single
reduction Newport News-Parsons geared
turbines; Babcock & Wilcox boilers; keel
3/1/31 launched 2/13/32 deliver 6/7/32

Ranger, hull 353, Aircraft Carrier No.
4 for U. S. Navy Dept.; keel 9/26/31;
deliver 5/1/34 est.

No name, hull 354, passenger and re-
frigerated cargo vessel for United Mail
Steamship Co.; 446 L.O.A.; 60 beam; 34
depth, 24 loaded draft; 17 1/2 knots speed;
1940 tons displacement; turbo-electric propul-
sion, 10,500 I.H.P.; keel 3/9/31;
launched 8/15/31 Reconditioning; deliver
5/26/33 est.

NEW YORK SHIPBUILDING CO., Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No.
35 for United States Navy; 10,000 tons
displacement; keel Mar. 31/30; launched
10/7/31, deliver 10/15/32 est.

Manhattan, hull 405, passenger and cargo
vessel for United States Lines, New York;
666 L.B.P.; 86' beam; 32' loaded draft max.;
20 knots speed; 12,000 D.W.T.; geared tur-
bines, 30,000 S.H.P., 6 B. & W. boilers;
keel 12/6/30, launched 12/5/31; deliver
8/1/32 est.

Not named, hull 406, passenger and car-
go vessel, same as above; keel 1/20/31,
launch 8/20/32 est.

Tuscaloosa, hull 407, Scout Cruiser No.
37 for U. S. Navy Department, Washing-
ton, D.C.; 578 L.B.P.; 60'11 1/2" molded
beam; 21'7" loaded draft, 10,000 tons
displ.; geared turbines; 107,000 I.H.P. 8
section express boilers; keel 9/3/31 de-
liver 3/3/34 est.

Reconditioning—Four vessels for Amer-
ican Seantic Lines, 390 by 54 by 32 ft

SPEEDEN SHIPBUILDING CO.,

Baltimore, Maryland

Purchasing Agent: W. J. Collison

Active, hull 272, steel patrol boat for
Supervisors of New York Harbor, New
York, N.Y.; 121'6" L.B.P.; 24'9" beam;
12'9" depth; 550 H.P. Fairbanks-Morse
diesel eng.; keel 3/15/32, launch 8/1/32
est.; deliver 10/31/32 est.

Not named, hull 273, diesel tug for U.
S. Public Health Service, New Orleans,
La.; 71 L.B.P., 16'11" beam; 8' depth; 210
B.H.P. Fairbanks-Morse diesel eng.; com-
pletion 250 days.

SUN SHIPBUILDING & DRY DOCK COMPANY, Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 146 single-screw steam-
ship for carrying loaded railway cars for Sea-
trans Lines, Inc., New York and New Or-
leans; 464'6" by 63'6" by 38'3"; 15 1/2 knots
speed; 8500 D.W.T.; keel 2/24/32; launch
8/27/32 est.; deliver 9/32 est.

Not named, hull 147, sister to above; keel
2/24/32; launch 9/3/32 est.; deliver 9/32
est.

UNITED DRY DOCKS, Inc., Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller

Hull 807, scow for City of New York;
70 L.O.A.; 30 beam; 7'6" depth; keel
1/18/32 launched and delivered 4/23/32.
Irrington, hull 809, ferryboat for Rock-
land Boat Corp.; 64'10" L.O.A.; 29' beam;
8'6" depth; 70 H.P. diesel eng.; keel
2/10/32; launched 4/6/32; delivered
4/8/32.

U. S. NAVY YARD, Boston, Mass.

MacDonough, U. S. Torpedo Boat De-
stroyer DD 351 for U. S. Navy, 340 ft
long, 35 knots speed; complete 8/11/34
est.

U. S. NAVY YARD New York.

New Orleans, light cruiser CA32, for
U. S. Navy, 10,000 tons displacement; de-
liver 6/2/33 est.

Not named, U. S. Torpedo Boat De-
stroyer (DD 350) for U. S. Navy, 340
ft long, 35 knots speed, complete 6/11/34
est.

U. S. NAVY YARD Philadelphia, Pa.

Monneapolis, light cruiser CA36 for U. S.
Navy, 10,000 tons displacement; deliver
10/12/33 est.

U. S. NAVY YARD Portsmouth, Va.

Dolphin, fleet submarine SS169 for U. S.
Navy, commissioned 6/1/32.

Cachalot, fleet submarine SS170 for U. S.
Navy, deliver 9/16/33 est.

New Todd President. — John D.
Reilly was recently unanimously
elected president of the Todd Ship-
yards Corporation to succeed Wil-
liam H. Todd, whose death took
place in Brooklyn on May 15.

Announcement of the appoint-
ment of Mr. Reilly, who had been
associated with the late Mr. Todd
for twenty-five years and for many
years has been executive vice-pres-
ident and a director of the corpora-
tion, was made by the directors.
At the same time it was announced
that George Dawe, head of the Rob-
ins Dry-Dock and Repair Company,
had been elected executive vice-
president in charge of operations,
and J. Herbert Todd, son of the late
William H. Todd, and head of the
Todd Dry Dock Engineering and
Repair Corporation, had been elected
vice-president and chairman of
the Executive Committee. These
officers and George G. Raymond,
vice-president and director of the
Todd Shipyards Corporation, in
charge of the Tietjen and Lang Dry-
dock Company, constitute the Exe-
cutive Committee.

Mr. Reilly is a native of Yonkers
and commenced his business career
at the Robins plant when Mr. Todd
was president of that company and
before the Todd Shipyards Corpora-
tion was founded. He is a director
of the Yonkers National Bank and
Trust Company and served five
years as a member of the Yonkers
School Board. He was the youngest
member of the Board. He is also a
Deputy Commissioner of Public
Safety.

William H. Todd, late president
of the Todd Shipyards Corporation,
died suddenly May 15 at the home
of his son in Brooklyn. In the an-
nouncement to the stockholders of
the company of the appointment of
Mr. Reilly as his successor, the di-
rectors stated in part:

"The late Mr. Todd's ability, en-
ergy, courage, and devotion to the
business made him an outstanding
figure in shipping circles, internat-
ional and national. The name and
goodwill of the company have been
firmly established in every mari-
time country in the world. Due
largely to his prudence and whole-
hearted interest in the welfare of
the company and its stockholders,
its resources and assets have been
conserved and built up and the com-
pany is in a strong financial posi-
tion."

Stabilizing Ships by Thyatron Control

THE possibilities of stabilizing large ships by means of a new type Thyatron control equipment, utilizing vacuum tubes and a small gyroscope, was demonstrated recently by Dr. E. F. W. Alexanderson, consulting engineer of the General Electric Company in connection with the banquet of the American Society of Naval Engineers.

Using a small laboratory model, Dr. Alexanderson was able to imitate the rolling of a large vessel and show how his device not only would immediately restore the ship to an even keel but keep it stable regardless of wave motion. His plan is the use of fins, designed like streamline rudders, attached to opposite sides of a ship, or using the force of gravity by changing of weights which may take the form of pumping water from one tank to another. In using the fins, these tilt up or down according to the roll of the ship, very much as the wings of a seagull which keep the bird in perfect balance in the air. The movement of these fins is actuated by a small gyroscope, which relays its tiny impulses, greatly amplified by means of the Thyatron control, through wires to motors built inside the fins. Thus, if the ship should be inclined to roll to one side, the fins, would immediately be tilted down on one side and up on the other and vice versa, as reversed conditions in the wave movement occur.

"This system of stabilization control was proved to work so successfully that we are able to demonstrate a much more difficult type of stabilization," Dr. Alexanderson explained. "By turning the model upside down, and using gravity stabilization, we can make it imitate the balancing act of a tight rope walker. When a tight rope walker feels that he is falling one way he moves his balancing rod in the opposite direction and thus by continued motion, he maintains his balance. This requires a high degree of coordination between mind and muscle. In the model the mind is represented by the little gyroscope, but the gyroscope itself does not produce stability as can be seen, because without the amplifier it is a perfectly dead piece of machinery which falls one way or the other. However, when the amplifier is turned on, it comes to life and holds its position of equilibrium and it may be noted that it does so slowly and deliberately with very little motion. If you disturb it by force, it reacts violently in order to correct its equilibrium.

Fins could be installed on the outside of existing ships without great expense. The slowing up of the ship due to the resistance of the fin in the water has been estimated from data available on streamlining, and also from direct experiments, he said. Results obtained in these several ways indicate that the useful lateral force of the rudder or fin is thirty times as great as its resistance when in its neutral position. Calculated on this basis it appears that a 23-knot ship with 50,000 horsepower would be delayed but 40 minutes in a transatlantic voyage, and a 30-knot ship with 180,000 horsepower but 10 minutes. This is on the assumption that the voyage was undertaken in a smooth sea and the stabilizer not used.

It was his belief that in a rough sea, this loss of time would be compensated for by the stabilizer keeping the ship on an even keel.

"Just as we have used amplification in radio, with which most people are familiar, it is now possible, with this new Thyatron tube, to control the amplification of mechanical forces so that a delicate touch can regulate the movement of large masses with extraordinary accuracy. We are looking forward to the use of this principle in many branches of engineering," Dr. Alexanderson said.

Synchronous Signalling

(Continued from Page 272)

Henry, Virginia. In view of the ease with which the air oscillator and radio can be synchronized to send out signals simultaneously, the two were synchronized later. On February 26, 1929, a test of this arrangement for distance finding was made by the Lighthouse Bureau. This test was very successful; distances, with sufficient accuracy for navigation, were obtained readily up to the limit of audibility, which under the prevailing weather conditions that day was about 6 miles.

On May 23, 1929, this synchronized distance finding signal station was placed in commission and it appears to be the first instance of the synchronization for distance finding purposes of a regular sound-in-air fog signal and a radio beacon.

While of necessity limited and variable in range, it is proving to be useful to vessels in fog and haze in getting their distance off important points. This system requires no additional apparatus at a station equipped with the Electric Air Oscillator of the Submarine Signal Company and a radio beacon, other than a simple synchronizing device.

Synchronized Submarine Signals

Water, on the other hand, has many important advantages over air as a medium for transmitting sound signals. For one thing, it is free from the dangerous zones of silence which occur when sounds are produced in air. Furthermore, the absorption of the sound is much less in water and consequently the sound signals can be transmitted to a distance many times greater than when they are transmitted through the air. Most important of all, however, is the fact that the submarine oscillator signals can be synchronized with the radio beacon so that the mariner may determine his distance from the station.

From the data as to his distance combined with a radio or submarine signal bearing, or from the data furnished by two distance determinations separated by a known time interval combined with the course and distance run by the vessel during this interval, it is a simple matter for the mariner to determine his position with ease and accuracy. Although a mariner may know the bearing of a lightship, he does not know where he is along that bearing and a period of uncertainty exists until he sights the lightvessel. If, on the other hand, he has knowledge of the distance, in addition to the bearing, he can be sure of his position and there is no period of uncertainty.



Marine Insurance

Edited by James A. Quinby

Cancellation of Policies

Legal Principles Governing the Termination of Insurance Contracts

MARINE insurance policies, like other insurance contracts, are customarily written for a limited or unlimited period of time and contain a provision that the coverage may be terminated at any time by either party giving five, or ten, or thirty days notice in writing to the other party. In practice, the party giving the written notice is usually the underwriter, and his most prevalent cause for cancellation is the failure of the assured to pay the premium when due. An assured who has not paid his premium for some months is likely to be a poor moral risk, and the careful insurer will cancel his policy immediately, before some heavy loss occurs from which the unpaid premiums may be reluctantly deducted.

In these days of depression, unpaid premiums are becoming increasingly common, and it may not be amiss to examine the ways and means by which a policy may be terminated.

The Broker's Position

A broker is like a chameleon—he changes his color with his association. For some purposes he is, in the eyes of the law, an agent of the insurer (as, for example, when he is collecting a premium). For most purposes, however, he is the agent of the assured. As agent of the assured, however, his duties do not ordinarily include the power to accept notice of cancellation on behalf of his principal. The Supreme Court of the United States had this question before it in *Grace vs. American Central Insurance Co.*, 27 L.Ed. 932, where a broker obtained for the assured a fire policy providing that it could be terminated by notice, and further providing that the broker was to be considered the agent of the assured and not of the insurer. The insured premises were destroyed by fire, and the company refused to pay the loss, alleging that they had cancelled the risk prior to loss by notice to the broker. The court held that the broker was such an agent that his authority extended only to procuring the insurance, and that notwithstanding the language of the policy, the attempted cancellation notice was not valid and the insurer was liable. The court said:

"The contract, as we have seen, did not authorize the company to cancel it upon notice merely to the party

The Log

We were shipmates together
The deck log and me,
But our tales of the weather
Don't seem to agree.
Take that night in December
We drove through the fog—
Full speed I remember,
"Dead slow" says the log.

I do as I'm told
And try to forget
How we washed down the hold
And our cargo got wet
Comin' out of the Gate.
But the log says "Oh, no—
It was blowin' force eight—
She was leakin' below."

J.A.Q.

procuring the insurance—his agency, according to the evidence, not extending beyond the consummation of the contract. The contract, by necessary implication, required that notice be given to the insured, or to some one who was his agent to receive such notice."

In *Northern Assurance Co. vs. Standard Leather Co.*, 165 Fed. 602, the broker was engaged to obtain a large amount of insurance for his principal. He had placed certain coverage with the Northern, but before he completed placing all the insurance, the Northern sent him a notice of cancellation. The court held in this instance that the notice was effective, since the broker was impliedly the agent of the assured

for all purposes connected with the insurance up to the time he completed placing it.

From the viewpoint of the underwriter, the only moral to be drawn from these cases is that notice of cancellation should always be sent to the assured.

Notice by Mail

Most modern insurance policies provide that a cancellation notice is effective if mailed to the other party. The numerous disputes which have arisen over the sufficiency of mailed notices, however, warrant our discussion of the various methods of effecting notice by mail.

In the first place, it must be remembered that the cancellation clause, like all other clauses in a policy of insurance, will be construed strictly against the insurer. This means that any ambiguity in the contract will be resolved in favor of the assured, on the theory that the underwriter prepared the document and is therefore responsible for its ambiguity. The cancellation clause, then, should be clear and concise. By the same line of reasoning, it logically results that the underwriter must comply strictly with his own terms for cancellation.

In the absence of valid provisions in the policy to the contrary, notice of cancellation, if given by mail, must be received before loss by the party entitled thereto. In *Farnum vs. Phoenix Insurance Co.*, 83 Cal. 246, the policy provided merely that "the insurance may be terminated at any time, at the option of the company, on giving notice to that effect and refunding a ratable

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proportion of the premium." After several ineffectual attempts to collect the premium, a cancellation notice was put in the mail addressed to the assured. A total loss occurred thereafter, and the court allowed recovery under the policy on the ground that there was no proof that the cancellation notice had ever been received by the party for whom it was intended. It should be observed that the policy bore no specific provision as to the sending of notice by mail.

However, if the policy allows notice of mailing to a given address, the result is more favorable to the insurer. *Raiken vs. Commercial Casualty Ins. Co.*, 135 Atl. 479, was an action on a casualty policy providing for cancellation "at any time by either of the parties upon written notice to the other party Notice of cancellation mailed to the address of the assured stated in the warranties shall be a sufficient notice."

The address stated in the warranties was incorrect, but the assured had failed to note the error when agreeing to the warranties. A notice was mailed to the address given in the warranties and was, of course, never received by the assured. The court held that the cancellation was nevertheless effective, since it was mailed in accord with the provisions of the policy.

In *Wolonters vs. U. S. Casualty Co.*, 101 SE 58, the cancellation clause was less definite. It permitted cancellation by written notice "mailed to the assured's latest address appearing on the company's record." The assured changed his address and communicated with the company on two occasions from his new address. A notice mailed to his old address was held invalid.

Another interesting case on the point is *Kamille vs. Home Fire & Marine Ins. Co.* (1925) 221 N.Y.Supp. 38, in which the policy provided for cancellation by notice mailed to the address given in the policy. The insurer, wishing to be safe, took the precaution of mailing the notice to the address given and putting on the envelope "personal receipt of addressee required." As the assured was not home, the postman did not leave the letter. It was held that this notice was not effective, since the personal receipt requirement prevented the assured from actually receiving the notice.

From these cases, it would seem that the cautious underwriter who wishes to protect his cancellation rights must do two things: (1) provide in his policy that notice is valid if mailed to the address given in the policy, and (2) mail the notice to that address by ordinary mail, taking care that he is able to prove the fact of mailing. An additional copy of the notice, with a return receipt requirement, can be sent as a further precaution.

"Freight Payable, Lost or Not Lost . . ."

CARGO owners and underwriters have frequently protested against the injustice of provisions in current bills of lading which specify that freight on a given shipment is to be considered earned and retained by the carrier whether or not the vessel and goods arrive at destination. At first glance the provision appears to be a harsh one as it enables the carrier to receive freight which is not earned. Our courts, however, have assumed that the parties were free to contract for such a provision if they saw fit, and have upheld the clause upon the theory that the carrier's reward for the hazards of merely undertaking the voyage must have been within the contemplation of the parties.

The latest decision on the point was handed down by the District Court of Appeal of California on May 11, 1932, in the case of *Transmarine Corporation vs. R. W. Kinney Company*, an action brought to recover freight for a shipment of wrought iron pipe placed on the ill-fated *Suduffco* in March, 1926.

The Pacific Coast underwriters will remember (and try to forget) that the *Suduffco* left New York on March 13 of that year, bound for San Francisco. On the following day, by wireless, she reported all was well and gave her position approximately 130 miles south of Scotland Light Ship. From that day to this nothing has been heard of or from the *Suduffco*.

The bill of lading under which the shipment moved provided as follows:

"It is hereby expressly agreed that the freight (as stated herein) whether prepaid by the Shipper or to be collected at destination becomes wholly due and belongs absolutely to the Carrier upon the receipt of the goods into the custody of the Carrier or its agents, and, if prepaid, is not to be returnable, and, if collect, is payable ship and/or cargo lost or not lost."

The cargo owner contended that, in spite of the wording of the above clause, the carrier was not entitled to recover its freight because of its failure to prove that nondelivery of the merchandise was due to a cause which would relieve it of its responsibility to earn the freight. The court disposes of this contention and upholds the bill of lading provision in the following language:

"The written contract of the parties unambiguously fixed the carrier's right to freight in plain words that require no interpretation — 'It is hereby expressly agreed that the freight (as stated herein) . . . becomes wholly due and belongs absolutely to the Carrier upon the receipt of the goods into the custody of the Carrier

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or its agents, and, if prepaid, is not to be returnable, and, if collect, is payable ship and/or cargo lost or not lost.'

Viewing the foregoing provision as a whole, it appears that thereunder, if the freight be prepaid (which, however, was not the case here), then, without any qualification, it is 'not to be returnable, . . . ship and/or cargo lost or not lost.' Let us suppose that the appellant had prepaid the freight under the foregoing agreement, that, upon payment, the freight belonged absolutely to the carrier, and that the same was not returnable even though the ship were lost. Could the shipper successfully sue for the return of that which it had agreed in writing should so belong to the carrier and be not returnable? An action to accomplish that object would not be upon the contract, but would constitute an attempt to defeat its very terms.

The defendant below did not prepay the freight, but did by the same solemn written obligation bind itself to the foregoing provision that the freight 'whether prepaid by the Shipper or to be collected at destination, becomes wholly due and belongs absolutely to the Carrier upon receipt of the goods . . . and . . . is payable ship and/or cargo lost or not lost.' It would be neither logical nor in accord with the plain intention of the contracting parties to hold that, if the freight was prepaid, unquestionably it belonged to, and was not returnable by, the carrier, but that, if not prepaid, the carrier, although by agreement the absolute owner of the freight, could not successfully sue for its recovery without proving an exculpatory reason for failure to make delivery of the cargo at destination."

The decision goes on to cite numerous cases in accord with the present holding, including *Standard Varnish Works vs. The Bris*, 248 U. S. 292, where the bill of lading contained a clause similar to the one in issue. In that case the shipper had prepaid the freight charges upon a shipment of goods, which, because the government did not grant the ship a clearance, never left port. In spite of these facts, the court held that the shipper could not recover back the freight, as the bill of lading definitely established the contract between the parties.

It is thus definitely held that the list of causes of loss for which the carrier shall not be responsible has no bearing upon the carrier's right to retain or collect freight charges stated to be "earned," both ship or cargo lost or not lost. The right to the freight under such a provision accrues upon the carrier's receipt of the goods and is entirely apart from any possible right which the cargo owner may have to recover for the loss of the goods.

Shipowner's Liability for Failure to Exact General Average Security

THE recent case of *Dibrell Bros., Inc., vs. The Prince Line, Ltd.*, cited by the United States Circuit Court of Appeals for the 2nd Circuit on May 23, 1932, re-affirms the principle that it is a shipowner's duty to collect proper general average security before surrendering his cargo at destination. The vessel in this instance carried certain hogsheads of tobacco which were damaged by sea water used to extinguish a fire in a bunker compartment adjacent to that in which the tobacco was stowed. Upon arrival at destination, all of the cargo was released by the ship without exacting security to protect the tobacco owner's right to contribution.

The shipowner's explanation of this failure consisted in stating that the master was not aware of the damage to the tobacco and consequently did not know of any right which he was bound to protect. The court disposed of this contention by finding that the hogsheads were so stained from the general average act that their condition should have been sufficient indication for a prudent master to have assumed that the contents were damaged.

The case on its merits merely restates a well recognized principle of maritime law. One interesting subordinate point, however, is worthy of comment. A second defense relied upon by the shipowner had its basis in the following clause contained in the bill of lading:

"Neither the carrier, the vessel, nor the agents shall be liable for any claim for loss of or damage to goods in any event unless notice in writing of the claim shall have been presented to the ship's agents at the port of discharge before the removal of the goods from the ship's custody."

The Court refused to apply this clause to a claim for general average, holding that the authorities made it clear that such clauses relate only to causes of action founded upon the contract of carriage and are not extended to claims based upon the law relating to general average. The court further commented that such notice clauses are harsh at best and should not receive a broad construction.



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Underwriters' Class
Ends Term

THE Marine Insurance Study Class, sponsored by the Association of Marine Underwriters of San Francisco, concluded the eleventh term of its activity on June 6.

F. B. Galbreath of the Marine Office of America favored the assembled underwriters with a short but comprehensive discussion of aviation insurance. He pointed out that the coverage on aircraft followed in general form the typical marine policies, but to date had largely been written in this country by fire companies. The chief branches of the coverage are (a) Hull, which is divided into fire and crash coverages; (b) Liability; and (c) Theft. The Theft coverage is relatively unimportant and most companies write the Fire coverage so as to exclude fire occurring immediately after a crash, unless full crash coverage is also taken. Mr. Galbreath stressed the importance of the human element in crash risks, pointing out that the underwriters are always careful to limit the coverage to planes which are operated by specified experienced pilots.

The second speaker of the evening was Norvin Fay, general manager of the River Lines, Mr. Fay, who was well known to his hearers through his connection with the Fay Transportation Company and other river navigation concerns,

gave a colorful talk on the development of river transportation in California. He discussed the gradual building of the levees during the early days of the State's history, and pointed out that ensuing floods resulted from this levee construction, which attempted to confine the river waters which had formerly wandered over the bed of the valley. The gradual silting up of the river bed, which prevented summer navigation above Sacramento, he ascribed to the operations of hydraulic mining. These operations have been forbidden for many years and the river bed is gradually returning to its original state.

At the meeting of May 16, Walter Anderson, of Anderson & Cristofani, boat builders, delivered an interesting talk upon the building and repair of small boats; Mr. Farnham Griffiths of the admiralty law firm of McCutcheon, Olney, Mannon & Greene, discussed "Deviation, General Exceptions, and Time Clauses in Bills of Lading."

The Class will hold the first meeting of its twelfth term sometime in September.

Freights, Charters, Sales

June 20, 1932.

THE following steamers have been fixed with grain to U.K.: British steamer Ben . . . , North Pacific to East Coast U.K., 21 f.i.o., June; British steamer Melmay, British Columbia to Liverpool and Belfast, May, Canadian American Shipping Co.; Norwegian motorship Ravnaas, Victoria, B.C., to Antwerp, 17 3, prompt, Continental Grain Co.

The following steamers have been fixed with grain to the Orient: Norwegian motorship Beljeanne, Vancouver, B.C., to Vladivostok, \$2.50, May/June, Kerr, Gifford & Co.; British motorship Fresno City, Vancouver, B.C., to China, \$2.55, option U.K., 18 3, July, Canadian Cooperative Wheat Producers Association.

The Japanese steamer Yoshida Maru No. 1, British Columbia to Melbourne, \$8.25, July, by Canadian Trading Co.

The American steamer Lake Omoc, Puget Sound and Willapa to Wilmington, Del., prompt, by Twin Harbor Lumber Co.

The following time charters have been reported: British motorship Forafrie, 1 trip, delivery Vancouver, B.C., redelivery St. Lawrence, June, Canadian Transport Co.; British motorship Glenbank, 1 trip, delivery British Columbia, redelivery U.K. Cont., \$1.02½, July, Canadian Transport Co.; British motorship Innesmoor, 1 trip, delivery North Pacific, redelivery U.K. Cont., \$1.05, July, W. L. Comyn & Sons; Norwegian motorship Norne, 1 trip, delivery British Columbia, redelivery Liverpool and London, \$1.20, prompt, Norton Lilly & Co.; Norwegian Motorship Fernbank, 1 trip, delivery British Columbia, redelivery U.K. Cont., Bordeaux Hamburg Range, 5 9, July, Canadian Transport Co.

PAGE BROTHERS, Brokers.

New Pier Completed.—San Francisco's newest pier, No. 23, at the foot of Greenwich Street, was formally accepted June 1 by the Board of State Harbor Commissioners. Final payment was made to the firm of Barrett & Hilp on a \$92,640 contract for the erection of a transit shed on the new structure. At the same time, the Harbor Board paid in full a contract of \$2,996.00 to the Healy-Tibbitts Construction Company for the removal of old Pier 21, which had been blocking ingress and egress to the new pier.

The new Pier 23 replaces two old piers, formerly numbers 21 and 23. Dredging will now be carried on at the site of former Pier 21, and while no formal assignment has been made, it is rumored that Pier 23 has been promised to the Kerr-Java Pacific Line, now at Pier 21.

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Trade News

New Pilot for Columbia Steel.—That the United States Steel Corporation holds its Pacific Coast District in high esteem is plainly indicated by the character and standing of the executive who is now actively in charge of this section of the vast holdings of that great amalgamation.

Ambrose N. Diehl, recently elected president of the Columbia Steel Company and Pacific Coast Manager for the United States Steel Corporation, is recognized as an outstanding national authority on steel. Mr. Diehl comes to these positions with a wide background of technical training and experience that have given him high prestige in steel manufacturing circles.

A native of York, Pennsylvania, Mr. Diehl prepared for college at York Collegiate Institute; was graduated in 1898 as Bachelor of Science at Pennsylvania State College, where he had been a member of Sigma Chi fraternity, a letter man in football and track, and president of the Athletic Association; took a year's post-graduate work in Penn State Experimental Station. In 1899 he took a chemist's job in the laboratories of the Duquesne Works of the Carnegie Steel Company. Transferred to the Blast Furnace Department, he became assistant superintendent in six months; superintendent in 1901; in 1904 and 1906 broke world's records for pig iron production.

In 1915 Mr. Diehl became assistant general superintendent at Duquesne Works and in 1917 was transferred to the Pittsburgh offices as Assistant Operating Vice-President of the Carnegie Steel Company. Late in 1918 he returned to the Duquesne Works as General Superintendent.

The business standing and public spirit of Mr. Diehl are indicated by the following offices held: President, Duquesne Trust Co.; President, Duquesne Library; Chairman, Duquesne Chapter, American Red Cross; member, Pennsylvania World's Fair Commission; Vice-chairman, Chamber of Commerce, Rivers and Harbors Committee; member, Pittsburgh City Rivers and Harbors Planning Commission; member, Board of Trustees and chairman of Athletic Council, Pennsylvania State College; president, University Club, Pittsburgh; director of American Institute Min-



A. N. Diehl, new president of Columbia Steel Company.

ing and Metallurgical Engineers; director of the Engineers Society of Western Pennsylvania.

In 1925, Mr. Diehl was made operating vice-president of Carnegie Steel Company in charge of the Pittsburgh district. In this capacity he served as director of Carnegie Steel Company, Sharon Coal Company; Carnegie Natural Gas Company; Bessemer Electric Power pany; Clairton Steel Co.; and Clairton By-Products Co. In 1930 Mr. Diehl was elected vice-president of the United States Steel Corporation and transferred to New York, where he has been closely affiliated with the executives and has become familiar with the vast corporate holdings of United States Steel.

Radio Direction Finders Installed.—Seven R.C.A. Radio Direction Finders were added to the total of these units in active service on the high seas, when equipment contracted for by the Moore and McCormack Company, Inc., was installed on vessels of that company's fleet of steamships. According to Charles J. Pannill, executive vice-president of the Radiomarine Corporation of America, Moore and McCormack will then have R.C.A. direction finding equipment on seventeen vessels.

The steamships on which installations were made are the Commercial Quaker, Commercial Alabaman, Commercial Bostonian, Commercial Floridian, Commercial Navigator, Commercial Orleanian, and the Commercial Pioneer, all of which are in coastwise service with ports of call between Boston and the Gulf of Mexico.

There are now more than 700 R.C.A. Radio Direction Finders in service on American freight and passenger ships.

Manila Rope Distributors.—Recently appointed distributor in southern California for the complete line of Waterbury Manila products is the San Pedro Rubber and Supply Company of San Pedro, one of the old established firms in southern California, carrying a full line of marine supplies for deck and engine departments. Many years of faithful and dependable service to the marine trade and a policy of carrying only the highest quality products obtainable have brought continued success to this firm.

Joseph M. Costello, in personal charge of marine contacts, adds to a thorough technical knowledge of, and a practical experience in, steam and diesel operation that pleasant, jovial personality which has made hosts of friends among the operating personnel of the merchant shipping using Los Angeles Harbor. Joseph A. Caminati, for many years office manager, takes great pride in an accounting system which greatly enhances the confidence of the firm's patrons. Howard S. Harris, in charge of the stock room, personally supervises all transportation and the filling of all orders.

Along with the full line of Waterbury Manila products, the San Pedro Rubber and Supply Company carries a full stock of and acts as marine distributor in Southern California for:

Leslie Reducing Valves and Regulators.

Green's Quick-Pack and Sairset Plastic furnace lining and cements.

New Jersey Asbestos Packings.

John Crane products.

Pioneer Rubber Mills hose and belting.

Important Radio Contract.—H. E. Coyle, Pacific Coast marine superintendent of the Mackay Radio and Telegraph Company, announces that his firm has entered into an agreement with the Standard Oil Co. (Calif.), to furnish, install, and maintain new modern vacuum-tube radiotelegraph apparatus on each of the twenty-one vessels comprising the company's fleet.

The agreement also includes the installation of three additional Kolster radio direction finders (radio compasses), which will make the Standard Oil Company (Calif.) fleet completely and exclusively "Mackay Radio" equipped and serviced with respect to both marine radiotelegraph apparatus and radio direction finders.

Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER

Propeller Club Head.—John Cormode has been nominated without opposition for the office of president of the Propeller Club of the United States, Port of Seattle. John Cormode is well known up and down the Coast as assistant to the vice-president of the American Mail Line in Seattle. Election of officers is to be held June 30, and other nominations include: J. T. Steeb and George Cary for vice-president; Frank Foisie for secretary-treasurer, Captain Hans Berd, W. D. Gould, Donald C. Stewart, and N. J. Leonard for two vacancies on the Board of Governors.

Moves Along.—A number of changes have come into the life of Edward W. Kinsey, well known passenger agent for the Nippon Yusen Kaisha at Los Angeles for the past year. Kinsey sailed from San Francisco recently aboard the Shinyo Maru en route to a new post as General Passenger Agent for the N.Y.K. offices in Hong Kong. On the way to the Orient he stopped off the ship for a day in Honolulu to be married to Miss Betty Steere, a resident of Hawaii, whom he met while she was attending the University of California at Los Angeles. Kinsey is a Notre Dame graduate and has wide experience in steamship circles on the Coast.

Seatrains Lines.—E. K. Morse has become associated with Seatrain Lines, Inc., as a vice-president. He was freight traffic manager of the Munson Line. He assumed his duties in the New York office on June 16.

New C. G. Head.—Word has been received from Washington, D.C., that Captain Harry G. Hamlet has been appointed as commandant of the United States Coast Guard. He was appointed by President Hoover to succeed Rear Admiral Frederick C. Billard, deceased. Captain Hamlet has over 21 years of sea service to his credit and is one of the highest ranking captains in order of seniority. He has been commandant of the Coast Guard Academy at New London since 1928. Captain

Hamlet is well known on the Pacific Coast, having spent more than twelve years in duty on the Coast, including Bering Sea, the Arctic, and Alaska waters. He at one time made his home at Port Townsend.



Captain Wallace Mangan, master of the newly reconditioned Puget Sound ferryboat Chippewa. The photograph was taken on the occasion of the vessel's trial run, and the captain is evidently greatly pleased with the vessel's operation.

Naval Officer Honored.—Lieutenant-Commander Jas. A. Crutchfield, U.S.N., was the guest of honor at a luncheon of the Bilge Club of San Pedro, on the eve of his departure for a new post in Honolulu last month. More than 100 of his friends were in attendance. He was extolled as the man who had done more to build friendly relations at Los Angeles Harbor between the navy and commercial interests than any other, and for his efficient development of the local hydrographic office. Crutchfield has been assigned to the submarine division at Honolulu.

Port Commissioner.—Colonel Geo. B. Lamping of Seattle has been elected president of the Seattle Port Commission at a meeting held last month. He succeeds W. S. Lincoln, who has been a commissioner of the port for the past twenty years. Smith M. Wilson has been appointed as successor to Mr. Lincoln on

the Port Commission. Other officers elected were: George F. Cotterill, vice-president, and Smith M. Wilson, secretary.

Celebrates Birthday.—One of the best friends of skippers entering San Francisco Bay is Collector of the Port, William B. Hamilton. This was clearly evidenced on June 1, when the venerable collector celebrated his 75th birthday when he was the recipient of congratulations from his subordinates in the service and from the scores of men connected with the shipping of the port.

New Naval Commandant.—Last month Rear Admiral William C. Cole, U.S.N., for two years commandant of the Twelfth Naval District, with headquarters at San Francisco, turned over his post and its duties to Rear Admiral George W. Laws. Laws has been commandant of the Mare Island Navy Yard since September 1928, during which time much important construction work has been done at the plant. He is succeeded at the navy yard by Rear Admiral Joseph M. Reeves, who has been senior member of the Board of Inspection and Survey in San Francisco.

Admiral Cole announced that he and Mrs. Cole are planning a three-months trip through the United States and will return to Berkeley to make their permanent home. He is scheduled for retirement under the age limit in September, and until that time will be on leave.

Port Board Formed.—The new deep sea Port of Stockton, California, has advanced to such a stage that a permanent organization to handle the business of the port and take care of the \$6,000,000 city and federal investment has become a necessity. The organization comprises the two groups of the advisory port commission which served for the past year. Composing the new Port Commission are Pliny E. Holt, chairman; Otto E. Sandman, Irving Martin Sr., N. M. Brisbois, and Samuel Frankenhaimer. Sandman and Martin were appointed by the Supervisors. Brisbois and



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Frankenheimer were appointed by the City Council. Holt was selected jointly by the two bodies and, as prescribed by the port district proposal voted by the people, became chairman.

The commission will serve without pay. Their first duties will be to adopt policies for conduct of the port and to appoint a port manager and staff.

Col. B. C. Allin, who has acted as port director for the city for the past year and one-half, probably will be named port manager.

Finances for placing the port in operation will be raised through a special port district tax, which cannot, by law, exceed 10 cents per \$100 assessed valuation.



R. Stanley Dollar, one of the leading figures in the shipping industry of the United States, who was recently elected president of the United States Lines Company.

U.S. Line President.—R. Stanley Dollar, vice-president and general manager of the Dollar Steamship Lines of San Francisco, and one of the principal figures in the organization controlling the United States Lines, has been elected president of the United States Lines Company of Nevada at a meeting of the directors in San Francisco several weeks ago.

Harbormaster.—Frank Sherman has been appointed harbormaster for the Port of Tacoma, Washington, according to recent announcement, succeeding Cary E. Janes.

Cutter Bear Again Feels Swell of Sea.—When the picturesque old revenue cutter Bear left the yard of the General Engineering and Dry Dock Company, Oakland, Cali-

fornia, last month for Boston to be taken over by Admiral Richard Byrd and his party in preparation for a two-year trip to the South Pole, she had on board a full supply of Texaco lubricating products specified for the main engines and the auxiliary machinery. Minor changes and repairs, including retubing of the boiler were effected at the Oakland shipyard. Byrd's agent, A. B. Raymond, chose the former cutter Bear because of her stability, her capacity, her strong construction, and the fact that she can be operated by both steam and sail. She is in command of C. Jorgensen and her engines are in charge of Chief Engineer William Kemp.

Charles R. Page, vice-president of Fireman's Fund group of fire and casualty companies, who had been nominated previous to his departure for New York and London on a recent trip, was elected June 21 a member of the Board of Directors of the San Francisco Chamber of Commerce.

Traffic Department.—The American-Hawaiian Steamship Company, with headquarters at San Francisco, has made several changes in the executive staff, according to an announcement by W. S. McPherson, Traffic Manager. Dearborn Clark, who was assistant traffic manager, is now Pacific Coast Traffic Manager with headquarters at San Francisco. F. W. Anderson, J. A. Stumpf, and William T. Izzard are now assistant traffic managers under Mr. McPherson, with headquarters in New York. Anderson, who was the company's district manager in New York, prior to the new appointment, has been succeeded in the position by C. M. Fedderman, formerly the company's assistant treasurer.

Veteran Steamboatmen's Annual Picnic.—The Veteran Steamboatmen of the West held their seventh annual picnic and reunion on June 25 at historic old Champoe, near Portland, Oregon, the park having been set aside by Governor Meier of Oregon for the Veteran's outing. Captain Arthur Rigg, president of the organization, was in charge of the arrangements and was successful in gathering together many of the "old timers" who related many an anecdote of the early days of flourishing river steamboating in Oregon, Washington, and California, as well as other parts of the U.S.A. It was particularly fitting

that this gathering should be held at Champoe, as this park marks the site used in 1811 by the Pacific Fur Company as terminus of canoe navigation on the Willamette River, and the district is rich in the history and romance of pioneer days.

Takes Malolo.—Captain Charles A. Berndtson, who was skipper of the Malolo for a long time, took the vessel out on several recent voyages, relieving Captain G. B. Wait who was on vacation. Captain Berndtson recently made a cruise on the Mariposa and is reported to be slated to command the steamship Lurline when she is ready for service.



Returning to his headquarters at San Francisco, W. H. Hoskier, Pacific Coast Manager of the International Mercantile Marine Company, announced that visits to all the leading ports on the Pacific Coast impressed him with confidence in the immediate recovery of shipping and the prospect of considerable intercoastal travel this summer and fall.

Steel Man Honored.—A. T. de Forrest, retiring president of the Columbia Steel Corporation of California, a subsidiary of the United States Steel Corporation, was honored with a testimonial dinner at the Palace Hotel, San Francisco, last month which was attended by fifty representative steel men of the Pacific area.

Mr. De Forrest is retiring after fifty-three years of constant service in the steel industry. He is 70 years of age. During twenty-nine years of the fifty-three he has represented the Columbia interests in San Francisco. He is being succeeded by Ambrose Diehl, vice-president of the Carnegie Steel Company of Pittsburgh.

Among those who spoke at the



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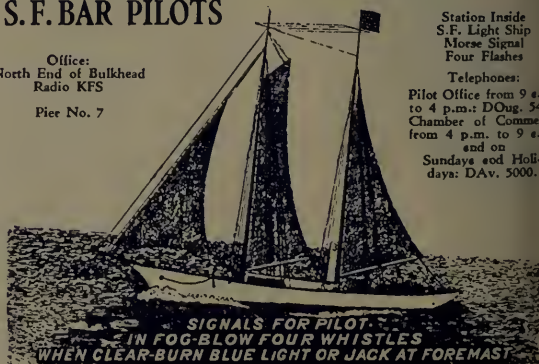
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banquet in honor of Mr. De Forest were: Francis J. Baker, president of Tay Holbrook Company, master; Arnold Foster, vice-president, Pacific Coast Steel Corporation; Harry L. Simon, president, Fourcar, Ray & Simon; and William B. Simpson, president A. M. Castle Company of Chicago.

New President.—The Harkins Transportation Company of Portland has a new president in the person of A. G. McCorkle, for many years with the General Steamship Corporation's offices in Portland. He succeeds Emmett G. Rathbun who has resigned. The Harkins company operates river steamboats and motorcraft in speedy freight and passenger service between Portland and Astoria on the Columbia River.

Conference Chairman.—K. C. Tripp has been elected chairman of the Pacific Coast—Caribbean Sea Ports Conference, succeeding R. S. Norton, freight traffic manager for Sudden & Christenson at San Francisco. Tripp is freight traffic manager at San Francisco for the North German Lloyd.

Hole in One.—It comes to a few of us once in a life-time. A Hole in One. Such rare event occurred last month in the life of George Schirmer, the envy of Pier 41, and member of the Schirmer Stevedoring Company, with headquarters at Pier 41, San Francisco. Schirmer made his hole in one stroke on the second hole of the ocean course of the Lakeside Country Club. The hole is 202 yards long. His total score for the round was 77—not bad among the shipping boys.

Honors Anniversary.—Clarence H. Matson, well known for the work he has done as manager of the Department of Foreign Commerce and Shipping of the Los Angeles Chamber of Commerce, was honored at a surprise testimonial luncheon last month given by the members of the harbor and foreign commerce committee of the chamber. The occasion was the twentieth anniversary of Mr. Matson's connection with the harbor work. A number of prominent shipping men of the port spoke at the luncheon and called attention to the great strides the port had made in the twenty years that Mr. Matson has worked for its progress and efficiency. Fred A. Hooper, district manager of the American-Hawaiian Line, was chairman of the occasion. Other speakers included E. A. Mills,



The intercoastal service of the Panama Pacific Line—and particularly the steamship Virginia—spells "home" to William G. Gillfillan, one of the most popular ship officers visiting Pacific Coast ports.

president Crescent Wharf and Warehouse Company; J. B. Banning, Jr., Los Angeles Steamship Company; Harry Dorr, Norton, Lilly & Company; Captain Harry H. Birkholm, General Steamship Corporation; Arthur Hugg, Southern Pacific; Grover Gearhard, Hammond Lumber Company; A. A. Schreck, Texas Company; Sol Schiff, importer; and Charles Krueger, head of C. G. Krueger & Company.

New Post.—Donald Todman was recently appointed General Freight Agent at Los Angeles for the Oceanic Navigation Company (Oriental Division), operated by the American Hawaiian. He succeeds Herbert Sewell, resigned.

Thirty Years on the Job.—Emil A. Winkler, well known to the shipping fraternity as Pacific Coast Pass. Mgr. of the Hamburg-American Line, recently celebrated the thirtieth anniversary of his connection with the noted German company. Mr. Winkler joined the company in New York in 1898 and came to San Francisco in 1914, remaining in this position until the United States entered the World War. He again joined the Hamburg-American Line in 1921 and was reappointed to his old position in San Francisco in April, 1928.

Customs Examiner Retires.—Well known to coastwise and transpacific mariners is W. J. Burns, head of the Dominion Customs Examiners at the Port of Victoria, British

Columbia. According to reports from Victoria, Mr. Burns is retiring after twenty-five years service.

I.M.M. Annual Report.—The annual report of the International Mercantile Marine Company was released May 26. Development under the American flag, undertaken in 1931, in conjunction with the Roosevelt Steamship Company, is emphasized in the report. First payment for an important interest in the new United States Lines Company was made in January, 1932. Ownership of the Roosevelt Steamship Co., Inc., by the International Mercantile Marine Company is shown by the report to be 100 per cent., represented by 22,000 shares of no par value stock. Forty-five ships owned outright by the I.M.M. Co. are listed, totaling 418,320 tons gross register.

Obituary

Gilbert E. Ryder, vice-president of The Superheater Company, New York and Chicago, died May 17 at his home in Larchmont, New York, from a sudden heart attack. Mr. Ryder joined the Superheater Company in 1911 and was elected vice-president in charge of sales in 1921.

A. Melville Dollar, eldest son of the late Captain Robert Dollar, died suddenly June 1 of heart disease in Vancouver, British Columbia. He had only recently returned to his home after attending the funeral services for his father. Alexander Melville Dollar was born in Ontario in 1878. While he was still a boy his father moved to San Rafael, California, and engaged in lumber and shipping business in San Francisco. After leaving school he entered his father's business, remaining there until 1916, when the Canadian Robert Dollar Company was formed. He was sent to Vancouver to take charge. In 1921 he formed his own company—the Canadian American Shipping Co.

Oscar King (O.K.) Davis, one of the most prominent figures in American shipping and foreign trade, died June 3 at Brooklyn, New York. Mr. Davis was secretary of the National Foreign Trade Council since 1917 and enjoyed a brilliant career as special newspaper correspondent for some of the leading American dailies. He was born in Baldwinville, New York, January 13, 1866.

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Book Review

Lloyd's Register of American Yachts. Published by Lloyd's Register of Shipping, 17 Battery Place, New York. Bound in blue with gold stampings. Price \$12.50.

The 1932 edition of Lloyd's Register of American Yachts is of special interest at this time as the evidence of the growth of yachting in America in the course of the past thirty years. The first volume of the Register, published in 1903, contained but 450 pages, with 42 flag plates; whereas the new volume has 836 pages, with 66 flag plates. The original list of yachts, to the number of 2789 as compared with 5325 this year, was divided into sail and power, in the proportion of 70 per cent. to 30 per cent. respectively, the power division being made up largely of steam craft, with a number of naphtha launches (now extinct), gasoline craft with 2-cycle engines, and a few sailing yachts with the same engines as auxiliary power. In the great fleet of today, less than 2 per cent. are without engines, while of the remaining 98 per cent. there are only a few steam yachts, with a large and rapidly increasing number of yachts fitted with Diesel engines, either driving direct or through electric motors. In addition, the diesel engine is rapidly making its way in the smaller power yachts, as well as for auxiliaries.

Another evidence of the great growth of the sport is found in the club statistics. The 1903 book included a total of 92 yacht clubs, with their burgees. In the 1932 book are entered 578 burgees of yacht clubs and associations, with full lists of officers and other particulars. Anyone who studies carefully this important period of yachting development in America must be impressed by the fact that in collating and distributing, all important statistics of the sport, Lloyd's Register of American Yachts has been an important essential factor in its advancement.

Boilers.—Foster Wheeler Corporation, 165 Broadway, New York, has recently published a new catalog describing various types of boilers manufactured by the company. This is bulletin B 32-3. It comprises 48 fully illustrated pages and is divided into four parts.

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AMERICAN SHIPBUILDING NEWS

Liner Named Washington.—When the second of the luxurious transatlantic liners now being completed for the United States Lines by the New York Shipbuilding Company is launched at Camden late in August she will be christened Washington, according to an announcement by P. A. S. Franklin, chairman of the Board of Directors of the Roosevelt Steamship Company, which operates the lines as general agent.

The decision to bestow the name of the nation's capital city upon the sistership of the new Manhattan was made by the directors of the United States Lines Company at a recent meeting of the board. While a number of notable American names have been under consideration for the second vessel, the directors felt that it was particularly fitting to give the name Washington to an outstanding American ship that will be launched in this Bi-Centennial year, when the whole nation is paying tribute to the name of its First President, in whose honor the capital city was named.

Closes Plant.—Todd Shipyards Corporation has closed the Clinton Plant and transferred its drydocks, floating equipment, and machinery to the Tebo Plant, foot of 23rd Street, Brooklyn.

With this additional equipment this latter yard, which will be known as the Todd Dry Dock Engineering & Repair Corporation plant, is said to be one of the most modernly equipped ship repair plants in the harbor. Its four floating dry-docks will provide lifting capacities up to 8500 tons. It will have complete facilities for handling every class of ship repair work on vessels up to that size.

The closing of the Clinton plant, which has been in operation since 1919, is in line with the company's policy to effect economies in overhead wherever the consolidation of operations is possible and desirable. Berthing and other facilities for the handling and storage of yachts will still be provided. The building ways for the construction of ferries, barges, and harbor type vessels will be continued.

Reorganization of the executive staff was announced at the same time. J. Herbert Todd was elected chairman of the Board of the Todd Dry Dock Engineering & Repair Corporation, which has been the operating company of the two plants. Joseph Haag, Jr., was elected president; William H. Smith, executive

vice-president; and James McDonald, vice-president.

New Dredges Under Construction.—Two new pipe-line dredges are now being built for the government by the Dravo Contracting Company, Neville Island, Pittsburgh, Pa., which has just ordered the dredges' electrical equipment from the Westinghouse Electric and Manufacturing Company.

Cutters of 225 horsepower will tear up the bed of the Mississippi. The equivalent of another 1200 horses will suck up silt, mud, and water. A pipe, 20 inches in diameter, will convey the sludge back of the shore line, if necessary, 1000 feet from the dredge.

The new dredges will be among the most efficient ever designed, according to Westinghouse engineers. Steam turbines will power electric generators and they, in turn, will furnish current for the cutter's and the pump's electric motors. The two dredges will be used in the St. Louis district on the Missouri and Mississippi Rivers by the U. S. War Department, which has charge of river and harbor maintenance and development.

Protest Government Building of Ships.—In speaking before the special House Committee investigating government competition with private business, H. G. Smith, president of the National Council of American Shipbuilders, stated that construction of vessels used by the government should be done entirely by private firms through competitive bidding methods. He further stated that the government had been doing much of its shipbuilding during the last ten or fifteen years of naval vessels, repair work, and construction and repair of army transports, army dredges, coast guard craft, and other type of watercraft used by the Government. Out of \$295,000,000 worth of ships built since the war, he maintained, approximately \$155,000,000 worth has been done in government yards. "These vessels are built from funds raised from taxes and when the vessels are built by the government it is just taking that large volume of business from private industry on which taxes are paid." The committee agreed to hear a more detailed report at a later date.

Lighthouse Tender.—The Bath Iron Works Corporation are preparing to start work on the 131-foot United States lighthouse tender

Hickory with the expectation of making delivery on the boat in February, 1933.

The vessel will have a molded beam of 24 ft., 6 in., a depth of 11 ft., 9 in., a draft of 8 ft., 6 in., and a displacement of 600 tons.

It will be propelled by a 500-h.p. triple-expansion engine, 11½ by 19 by 32 inches by 24-in. stroke. Steam will be furnished by one Babcock & Wilcox water-tube boiler.

Inasmuch as most of the service for the vessel will involve handling of buoys and other lighthouse materials, the principle machinery on the main deck will be a large 4-drum steam-driven hoisting engine with cable operating through a large steel mast and lattice boom to form a derrick forward of the superstructure. The vessel will also have an electric windlass and steam steering gear.

There are accommodations below for 12 men in the crew, and officers' quarters are on the main deck aft. The steward's quarters also are on the main deck and accommodate 4 men. On the upper deck aft is a separate house containing two state-rooms, bath, pantry, and salon.

The small boat equipment consists of a 22-foot power boat and a 20-foot whale boat.

Floating Storage Plant.—The Texas Company of New York purchased the steamship Westlake from the U. S. Shipping Board Merchant Fleet Corporation on May 17 for \$15,000, "as is, where is." The vessel is to be used as a stationary oil plant, all machinery and equipment not essential to the storage plant are to be completely scrapped, according to terms of sale. The Westlake is an oil-burning vessel of 8548 deadweight tons, equipped with General Electric turbines and gears and three Scotch boilers.

Buys Yacht.—Reversing its plans to construct a 95-foot survey boat the United States Engineers Office, Buffalo, New York, has purchased the yacht Spitfire from Wilbert Melville, New York, for the sum of \$21,620.

Sells Freighters.—The Merchants & Miners Transportation Co., has purchased the steam freighter Lake Glasco from the Merchant Fleet Corporation, U. S. Shipping Board, for \$30,000 and will recondition the vessel to adapt it to the coastwise trade. The Lake Glasco is an oil-burning, lake-type freighter of 4155 deadweight tons, equipped with one triple expansion engine and two Scotch boilers.

Pacific Marine Review

AUGUST, 1932

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Pacific Marine Review

The National Magazine of Shipping

VOLUME XXIX

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Bernard N. De Roehie,
Vice-President and Manager

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Member of Pacific Traffic Association

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Chas. F. A. Mann, Northwestern Representative, 1110 Puget Sound Bank Bldg., Tacoma, Washington

Official Organ
Shipowners' Association
of the Pacific Coast

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Shipbuilding in the United States

ON January 1, 1932, privately operated shipyards of the United States had under construction 23 seagoing steel merchant vessels of 1000 gross tons or over, aggregating 237,400 gross tons. On January 1, 1931, these figures were 28 vessels aggregating 308,800 gross tons. As of May 1, 1932, there are under construction 15 of these vessels aggregating 182,400 gross tons. On January 1, 1932, shipbuilding plant in the United States was estimated to be operating at 45 per cent. of its capacity. Today it is operating at less than 25 per cent. capacity.

There were also under construction in private yards on January 1, 1932, eight naval vessels aggregating 49,900 displacement tons.

All of this construction is estimated to be completed before the middle of 1933. There are 28 merchant vessels yet to be contracted for under the long-term mail contracts already awarded. The building of these 28 vessels will be spread over a period of eight years.

The outlook after the present work is completed is very unfavorable unless sufficient stabilization of the world's shipping business occurs to induce American shipowners to build new, modern freighters for inter-coastal and overseas trade routes. It is estimated that an annual replacement program of 340,000 tons will be required to start in the very near future to retain our present position in world shipping.

The shipyards are showing, in recent bidding on new work, reconditioning work, and repair work, that they are getting into a desperate condition. In some instances the spread of bids is over 35 per cent., with the high bid close to actual cost plus a fair profit. In other words, the low bid appears to be 25 per cent. below actual cost.

The United States shipbuilding yards are an indispensable adjunct to the United States Merchant Marine

and to the United States Navy. The need for these yards has been amply demonstrated in every national emergency.

Cooperation from the federal government can be expanded by two methods.

First, by encouraging shipowners to build fleets of modern freighters to replace their obsolete tonnage.

Second, by keeping the navy up to the 5-3 ratio strength as determined at the Washington Conference and by giving the private yards a larger opportunity for competitive bidding on naval work.

In all consideration of additional federal cooperation in shipbuilding and ship operation, there should constantly be in the mind of Congress these considerations:

1. The Pacific is the great potential arena of world trade and world strife.

2. The Pacific lanes are long and the harbors on the Pacific Coast of the United States are few.

3. The private shipyards and the navy yards at Pacific Coast ports are therefore more the concern of federal government in a truly national policy than are those on any other coast.

4. It would therefore seem to be wise to grant special consideration to Pacific Coast yards in any future program of federal cooperation in shipbuilding.

Depreciation and Obsolescence

THE generally accepted theory of ship depreciation is that the modern steel steamer has a life of twenty years in ordinary service. Many shipowners base their depreciation accounts on this theory and have found it satisfactory. Many shipbuilders, looking into the future, base thereon a hope for new contracts. Often the result of the shipbuilder's hope is not so satisfactory as is the outcome of the shipowner's bookkeeping.

Many steel vessels in the ordinary cargo trade have a useful life much longer than twenty years, and often the most profitable years of their useful life may be those years when they are in their "teens" or even those when they have passed their allotted "score."

Consider a ship of 10,000 deadweight tons capacity which, built twenty years ago, has a good triple expansion steam engine developing approximately 3000 horsepower, taking steam at 185 to 200 pounds pressure from oil-burning Scotch marine boilers and producing 10 to 10½ knots sea speed. Her engine and her screw turn at 85 to 90 revolutions per minute. She has a generously proportioned condenser with very low velocity of circu-

lating water. She has had good average care. Her owners and operators had her built for their own special route to handle general cargo. Their personnel are accustomed to her. Everything about her fits into their picture with the comfort of an old shoe. They have kept books on her carefully and methodically for 18 to 20 years and have written her original cost clean off their accounts. She cost new around \$600,000. They might be able to sell her for \$75,000 to \$100,000. They call for bids for a similar steamer or motorship to take her place and receive a low bid of \$1,100,000 with other bids ranging up to \$1,500,000.

Freights are low and cargo scarce. The trade routes of the world are undergoing continual dislocation. The old ship is operating more economically now than ever before, and certainly much more economically than could a new ship with such a first cost. A survey shows she is good for ten years more at least. Only one thing to do.—Keep on operating the old vessel.

But how about obsolescence? Will competitors with newer, faster vessels secure the cream of the business? In some routes, particularly on the longer ocean trade lanes it seems apparent on the surface that the faster vessels are now getting the cream of the overseas cargoes. An analysis of Shipping Board statistics shows that in dry cargoes overseas, the freighters of foreign nations other than British are taking the United States business away from both British and American freighters. Now, the foreign nations, other than British, have been specializing during the last decade in building fast motor cargo liners. The Japanese and the Dutch have got freighters now running as high as 18 knots. Ipso facto, then it would appear that these foreign fleets, other than British, are taking away our business and that of the British by reason of superior faster equipment.

Is it necessary, then, that these shipowners who have the 10,000 deadweight tons, twenty-year-old, 10-knot vessel should build a new 18- or 20-knot cargo ship to retain their overseas business? Calling for bids on that basis, they will find their cost jumping to some figure around \$2,000,000, with consequent higher operation costs.

Have the foreign faster ships been making money under present conditions? The statements of their operating companies show very little evidence of dividends and considerable indications of red ink. Many of these statements show a tendency on the part of such operating companies to neglect safeguards which experienced experts in shipping finance regard as necessary.

Meantime, as Roger Lapham so candidly remarks in his recent address before the United States Chamber of Commerce, "the problem before the American merchant marine is not new ships, but better business relations with our overseas customers, and less barriers to the flow of international trade—so that we can have more cargo at better rates to fill the ships we are now operating."

Rowing on San Francisco Bay

NO events in recent years have brought such a thrill to the hearts of California's citizens as the winning of the Olympic rowing contest by the University of California crew in 1928 and the success of the California crew this year

in winning the right to represent the nation at the 1932 Olympic Games in Los Angeles.

San Francisco Bay, since the days of '49, has always been a cradle for rearing of champion oarsmen. The year round temperate climate, the long stretches of open water, traditions of the days when the Whitehall boats propelled by oarsmen of mighty thews and great staying power raced to meet the stately clippers outside the gate—have all combined to foster the growth and stability of the rowing clubs that fringe the shores of the harbor. Even the raw cadets of the California School Ship on their first cruise cleaned up nicely on all their ship's boat rowing contests in the cruise around South America to the Atlantic ports of the United States.

In keeping with this tradition and this spirit, rowing races between merchant ships' boats have been made one of the very prominent features in the program of aquatic events of the Annual San Francisco Harbor Day celebration as sponsored by the Junior Chamber of Commerce.

The Junior Chamber turned over this rowing contest feature to the Propeller Club of California, and that body has managed the affair with such deft fairness that it has become one of the most important factors in keeping up the esprit de corps of the crews of ships regularly making this port. Many of the rowing crews train as faithfully for this event as do the great champions under Ky Ebright at the University of California.

Herbert Brooks Walker

THE advancement of the merchant marine of the United States lost a great leader with the passing of Herbert Brooks Walker, president of the American Steamship Owners' Association on June 23 at his home 575 Park Avenue, New York.

Mr. Walker was born in Philadelphia in 1870 and was educated in the public and private schools of that city. At the age of 13 he joined the Old Dominion Steamship Company as a messenger boy and in twenty-four years of hard work became president of that line, a position which he held from 1907 to 1926, when he resigned to assume the executive leadership of the steamship owners' association.

Mr. Walker was a member of the board of managers and of the classification committee of the American Bureau of Shipping; of the transportation committee of the United States Chamber of Commerce; of the board of governors and the steamship committee of the New York Maritime Exchange; of the shipping and foreign trade committee of the Chamber of Commerce of the State of New York; and of the shipping committee of the New York Board of Trade, Inc. He headed the United States delegation to the 1930 International Load Line Conference in London; was a delegate to the International Convention for the Safety of Life at Sea in 1929; and to the International Shipping Conference in 1928; was director of Coastwise Lines for the federal government during the World War. He was an associate member of the Society of Naval Architects and Marine Engineers.

Mr. Walker was a consistent and strong supporter of measures calculated to build up the merchant marine of the United States and was a very vigorous opponent of all measures adverse to that interest. His wise counsel and deft guiding touch will be sorely missed in American maritime circles.

Reciprocal Tariff Reduction

Proposal for an International Agreement that should be of Great Interest to Shipping

By A. C. Holzapfel

SINCE the Peace of Versailles tariffs for import duties have been raised in practically all countries. Now that the violent trade fluctuations which set in after the economic disturbances of the war have subsided, we find that the trade barriers thus set up have not only reduced international trade to a considerable extent, but have very largely disturbed the flow of trade within each country; so that although there is an enormous surplus of commodities in most countries, the same is not accessible to a considerable percentage of their own populations. Such a reaction of international trade disturbances on national business has never occurred before simply because international business had never reached such dimensions as just before the war and during the ten years of violent fluctuations following it.

The prosperity enjoyed by the United States of America during the recent ten years was accentuated by the fact that European countries had concentrated all their productive power on the war and were for several following years engaged almost exclusively in reconstruction. It is hardly to be expected that such a state of prosperity as existed in the United States during the years following the war will occur again for many decades and that the high standard of living enjoyed during that period can be maintained in the future. Prosperity in the United States depends largely on exports. Our agricultural and industrial production is much greater than our consumption and we must find markets for our surplus. Moreover, the habit of our people to travel to Europe to spend some of their surplus funds would soon exhaust our finances if we did not export more than we import. However, we cannot sell to other countries unless we buy from them at least a considerable portion of the value of the goods which we sell them or unless an adequate measure of exchange is maintained. In order to protect our nascent industries, fifty years and more ago we adopted import tariffs. Meanwhile, however, our industries have grown up and have become far more powerful and better organized than those of other countries. Nevertheless, the import duties have not been lowered; on the contrary, they have been raised and have been the source of higher wages to labor than existed in other countries and higher return on capital. In fact, there is no doubt that nine-tenths of the large corporations occupied in the United States industrial field have made larger returns on a capital, the bulk of which was fictitious, sometimes called "good will," sometimes "gas and water." This situation reached its highest point between 1924 and 1929, and was followed by a reaction somewhat corresponding in extent to previous inflation, a reaction from which we are still suffering intensively. Many politicians and even leaders in industry thought at first that this reaction would be of less intensive nature, would be more like previous slumps in business, not realizing that it followed on an **unprecedented** period of prosperity.

The inflation caused by the great war is past, and we must now endeavor to get back to normal, to conditions

somewhat similar to those which existed before the war.

However, the slump in business is not confined to this country alone, it is universal and has led to disorganization of business and politics in all civilized countries.

This development has been largely caused by the high tariffs created since the war which have prevented the free flow of international trade which existed before the war and also caused severe congestion in the home trade of the various countries whose agriculture and industries had been adapted to a certain volume of export trade; which being largely prevented by tariffs, congested home markets and brought about the remarkable fall in prices with which we are now faced.

Obviously, the remedy would be to get all nations to recognize these facts and to get them all to lower their tariffs sufficiently to allow international business to resume its wonted volume. But this is a difficult process. Tariffs create jealously guarded interests, guarded by politicians and lobbyists and by high financial interests. They have also served to bring an income to the government, although where they have reached certain limits they have become less productive of revenue than their sponsors had estimated. Still, I, for my part, cannot see how the present conditions of world trade can be remedied unless these tariffs are lowered.

Coincident with the business aspect of this question, the political effect should be borne in mind. If it is true that business interests cause wars, then it should be borne in mind that a free flow of business brings us closer and into friendlier intercourse with other nations. The world, by means of railroads, shipping, aircraft, telegraph, wireless, and radio, has become smaller and smaller. Literature and philosophy, also religion, if rightly interpreted, teach us that we are all parts of one great scheme of nature, and that brotherly love, mutual esteem, should replace the prejudices of race and nationality which have been the bane of past history.

Here I must make some remarks in regard to the prevalent idea that the United States is a privileged country and that its inhabitants are justified to enjoy a higher standard of living than other nations. True, owing to the wealth and wonderful industrial and commercial organizations of this country, they do and are likely to continue to enjoy a better standard of living than other countries, but I consider it hardly necessary, generous, or manly to handicap other nations by high tariffs in trading to us those commodities which by climate, soil, or character they are in a better position to produce than we are.

What therefore I propose is, that the United States Government, in order to end the present political and business deadlock, should propose to all other nations to lower our own, the United States' tariff, to the extent of, say, 25 per cent. on present rates on condition that those nations lower their tariff to an equal extent, that is, on **reciprocal lines**. It is more than likely that

(Please turn to Page 294)

Speeds and Powers of Ships

Their Determination from Towing Tank Experiments with Scale Models

By Herbert C. Sadler*

ANYONE familiar with the innumerable differences in forms of solids represented by the various types and proportions of ships will realize the difficulty involved in determining from first principles the resistance of such forms to motion through water at different speeds. It is true that from time to time in the past various attempts have been made, but when it is realized that such analyses must involve in the first place a knowledge of three-dimensional flow around the particular body concerned, any hope for a solution from this method is somewhat remote.

As shipbuilding developed from an art to a science, particularly when the steam engine became the common means of propulsion, it became evident that a more precise knowledge of the properties of ships forms, with respect to the resistance of the same, was necessary. The impracticability of obtaining such data from experiments on full-sized vessels was obvious, and hence arose the question of the use of models as a means of determining the unknown factors.

Early Experiments

Probably the earliest attempt at any systematic experimentation on models was by Colonel Beaufoy in the years 1793-1798. In some of the earlier experiments, a pendulum, to which was attached the form of solid to be tested, was used, the model being swung through a tank of water. It is interesting to note that this same apparatus and method of testing were revived at a much later date; however, it is not representative of present-day practice. In his later work Beaufoy adopted a device somewhat similar to Atwood's machine, to which the model was attached and towed through the water. His experiments were confined to somewhat simple forms with geometrical ends.

From 1834 on, Scott Russell conducted a number of experiments on ships forms in a canal, from the results of which he published his theory of resistance in a paper before the British Association in 1869. About this time a committee of the association was formed, and as a result of their deliberations Wm. Froude recommended that systematic experiments upon ship models should be carried out. He later designed and was for many years in charge of the first experimental ship-model tank, and his methods with minor changes

have formed the basis for all such laboratories constructed since that time.

Ship Model Tanks

Briefly Russell's methods consist of a tank of sufficient length (varying from 300 feet to 1000 feet or more), with a breadth and depth of water such that no interference from the sides or bottom may be anticipated. Spanning the tank is a traveling platform which is driven electrically and is so controlled that it may be run uniformly at any desired speed within its range, the maximum speed varying in the different tanks and depending largely upon the length available.

Mounted upon this platform is a suitable dynamometer for measuring the resistance of the model which is attached thereto by a suitable towing device, and which leaves the model free to assume any position when running at any speed. The pull on the dynamometer, the distance traveled, and the time in seconds are usually automatically recorded upon a revolving drum. The rise and fall of the ends of the model, commonly known as change of trim, are also recorded. It should be noted that some controlling device is also necessary in order to maintain the axis of the model in the direct line of its motion, as experience has shown that all models tend to take a slight angle to this line if towed from a single point.

In some installations, a second dynamometer is also attached to the traveling platform in order to carry out experiments with model propellers. This is so arranged that it may be used either for the propellers alone or for experiments on the combination of these in their proper position behind the model ship.

In other laboratories, particularly where larger models up to say, 20 feet long can be used, a propeller dynamometer is mounted directly in the model ship, and the whole is tested as a "self-propelled" unit.

While problems relating to the speed and power of ships form the greater part of the investigations carried on in such laboratories, special equipment is usually installed for others upon which research is sometimes necessary. Among these may be mentioned the rolling of vessels and the effect of various devices for reducing it, steering qualities and the operation of rudders, and forces acting between passing vessels.

In general, most of the experiments are conducted in still water, as this eliminates the variable due to the disturbed conditions usually present in a seaway. It is practically impossible to reproduce these or to form any basis for their accurate measurement. However, it is possible to produce a series of "regular" waves whose periods and dimensions can be determined with a high degree of accuracy. Usually some type of mechanically operated "wave producer" is installed at one end of the tank, so that experiments can be conducted on the effect upon the resistance and behavior of a vessel proceeding in such a known seaway, and also in connection with rolling.

*Dean Sadler, College of Engineering and Architecture, University of Michigan, was graduated from Dulwich University, England, in 1890, and from Glasgow University, Scotland, in 1893, receiving from the latter institution the degree of Doctor of Science in 1902, and of Doctor of Laws in 1927. He was engaged in practical shipbuilding from 1890 to 1896, when he was appointed assistant professor of naval architecture in Glasgow University. He came to America in 1900 and became junior professor of naval architecture and marine engineering in the University of Michigan; he was promoted to full professorship in 1904, holding this position until 1928, when he became dean of the College of Engineering of the University. Dean Sadler presented this paper at the semi-annual meeting of the American Society of Mechanical Engineers, Bgwin Inn, Ontario, June 27.

Photography is also extensively used as a method of recording various items, such as wave formations, the position of the model under certain conditions, etc.; and the recent developments in the moving-picture camera have proved this apparatus to be a valuable adjunct to the general equipment.

From time to time the question of the effect of shallow water upon the resistance of vessels has arisen. This has involved the fitting of a movable false bottom to the tank which can be set at different levels corresponding to varying depths of water. This is a somewhat expensive adjunct and temporarily puts the tank out of commission for the regular run of experiments, as the process of fitting and removing it requires a good deal of time.

Preparation of Models

The preparation of models, which in general run from 10 feet to 20 feet in length, is an important factor in the operation of the laboratory. Two materials are commonly used, wood and paraffin. In certain locations where the temperature is likely to be high at certain times of the year, it is somewhat difficult to prevent the models from changing their shape if made of the latter; but in others no particular difficulty is experienced. Paraffin possesses advantages from the point of view of ease of handling and of economy, in that old models can be broken up and the material used again, and it has the additional one that the nature of the surface is always the same. Wooden models, while more permanent, are considerably more costly and must be painted or varnished.

Whichever type is used, an approximate model is first made, usually a hollow casting in the case of the paraffin type, or a laminated one if of wood. This is then placed in a profiling machine and cut to the true form as traced from the drawing. The final finishing process is usually performed by hand. The model propellers are usually made of bronze or some form of white metal and machined to the drawings in a specially designed lathe.

In the determination of resistance, the model is usually towed at a number of different speeds and the curve of total resistance is so obtained. This curve is made up of two parts, one the resistance due to surface friction, and the other the resistance due to form. The latter is commonly known as "residuary" or "wave-making" resistance. From experiments on planes of various lengths and different types of surfaces, the coefficients representing frictional resistance have been determined. The surface of the model can be obtained from the drawings, and, by applying the known factors, the curve of frictional resistance of the model may be determined. The difference between the total and the frictional resistance gives the residuary resistance at any speed.

This part of the resistance, due to the form of the body, is assumed to follow the general laws of dimensional similarity. While recognized in a general way before his time, Froude revived it in connection with the determination of the resistance of full-sized ships from experiments on models; and in the marine field the method is generally known as Froude's law of comparison.

Briefly, two similar bodies, the ratio of whose dimensions may be represented by L , will have their speeds and resistances connected by the following relations:

$$V = \sqrt{L} v \text{ and } R = L^3 v$$

where V and R represent the speed and residuary resist-

ance of, say, the ship, and v and r the same characteristics of the model, and L the ratio of linear dimensions; or at corresponding speeds the resistances will vary as the cube of the ratio of the linear dimensions.

The frictional resistance of the ship is determined by separate calculation, as in the case of the model, and this added to the residuary as obtained above will give the total resistance for the full-sized vessel. This resistance multiplied by the speed and an appropriate constant will give the net or "effective" horsepower required to drive the ship at any speed.

Mention should be made of the fact that the coefficients of friction have never been actually determined for planes of 500 to 1000 feet in length. From extrapolation from smaller lengths, various data accumulated from friction in pipes, and the application of hydraulic theory, coefficients have been obtained that are generally accepted as being approximately correct, although at the present time this is a somewhat controversial question.

To pass from effective to indicated, shaft, or brake horsepower of the propelling machinery, it is necessary to know or estimate various other efficiencies or losses involved.

Propeller Data

The first loss is that due to the propeller. Most of our knowledge of screw propellers has been obtained from systematic experiments upon models. Generally speaking, the model propeller is driven at a fixed speed of advance and the revolutions varied. Dynamometers are arranged for measuring the torque delivered to and the thrust given by the propeller, and the revolutions and speed are recorded. From these observations, the remaining figures for efficiency and slip may be obtained. For purposes of application to similar propellers of varying dimensions, the general law that at constant slip the thrust varies as the square of the linear dimensions and as the square of the velocity of advance, the efficiency remaining constant, is the one commonly applied: or if T = thrust, n = revolutions, p = pitch, d = diameter, Q = torque, and v = speed of advance, then

$$T \text{ varies as } d^2 v^2 \text{ or } d^2 n^2 p^2,$$

$$\text{and } Q \text{ varies as } d^2 n p$$

the expression for slip being usually represented as a percentage:

$$\frac{pn - v}{pn}$$

When a propeller works in conjunction with a vessel, usually at the after end, the conditions of flow are altered as compared with still water. Because of friction and streamline effects, the water, by the time it reaches the stern, has had impressed upon it a certain amount of forward motion. The result is that the propeller is advancing through the water at a speed lower than that of the vessel itself. The water to which this forward velocity has been imparted is commonly known as the "wake" and its velocity is usually expressed as a percentage of the speed of the ship. Under these conditions, therefore, the thrust of the propeller behind the model at a given number of revolutions will differ from that in open water, owing to the virtual change in speed of advance.

If the model propeller has been tested in the open and its thrust determined for varying revolutions at a given speed of advance, it is possible to determine from the above laws the speed of advance corresponding to its performance behind the model, and hence the speed

of the wake, or what may be deemed the equivalent wake.

The action of the propeller behind the model naturally introduces a modification of the streamline flow in the neighborhood of the stern, as compared with the bare hull. This is usually accompanied by an increase in resistance of the model and, as this is due to the propeller thrust, it is commonly called the "thrust deduction." The actual thrust horsepower therefore differs from the effective horsepower or power required to overcome the net resistance, and if the speed of advance of the propeller in the water in which it works be represented by V_1 , and the speed of the ship by V , then the ratio of these two powers, commonly called the "hull efficiency," will be represented by

$$\frac{RV}{TV_1}$$

When it is realized that one, two, three or four propellers may be used, and these combined with innumerable shapes of hulls and placed in various positions relative to the hull, the author thinks it will be evident that in order to obtain information as to the effects of all these variables, the only course open is that of systematic experimentation upon models.

The remaining losses, or efficiencies which have to be taken into account in determining the actual horsepower of the propelling machinery, are what might be termed mechanical, and are subjects for investigation by means other than the model experiments above described. In recent years certain experiments in the measurement of the actual thrust delivered in the full-sized ship have been made in order to throw further light upon the determination of the relation of the actual power required to that estimated from the application of the laws of comparison to model tests.

Propulsive Coefficient

There are therefore the two methods of determining the power for a full-sized ship. From the results of tests upon models alone, the effective or net horsepower required to overcome the resistance may be determined as described above. From previous data and experience, all the losses or efficiencies due to the factors mentioned may be estimated and combined into one factor representing the relation of "effective" to indicated or shaft horsepower. This factor is commonly called the "propulsive coefficient."

With the self-propelled model, certain of these constituent factors are subject to more detailed determination, and hence the margin of error due to the unknown items is considerably reduced.

Since the development of the hydroplane and hydro-aeroplane, experiments on models of these types have demanded much higher speeds, which are beyond the capacity of most of the tanks designed for normal ship forms unless undesirably small models are used. The one recently completed at Langley Field is a good illustration of this development.

In the necessarily prescribed limits of a symposium such as this, it is obviously impossible to do more than to give a general picture of the use of ship models in determining the power for full-sized ships, and the author feels that any detailed discussion of certain of the more technical points involved would be out of place. He would, however, like to refer to one phase of the subject that has received a good deal of attention during the past few years. While the classical Froude method has in the past given very satisfactory and valuable results, the modern developments in hydro-

dynamic theory have raised some points of controversy. The question of the type of flow around the model, whether laminar or turbulent, raises the question of the size of model, as the strict application of the laws of similarity demands that the flow pattern should be the same in both the model and the full-sized ship. The resistance will vary, depending upon whether the flow is laminar or turbulent or a mixture of both, and the tendency toward laminar flow increases with the reduction in size of model. Recent experiments on similar models of varying size have shown this to be the case, and hence a considerable error may be introduced in applying the large-scale factor to the full-sized ship. One interesting method adopted to assure turbulent flow has been that of fitting a thin wire around the model at the bow which affects the flow at the boundary layer. The variation of viscosity with temperature also involves a correction in order to insure direct comparison between models, although this becomes of minor importance in the case of full-sized vessels.

Reciprocal Tariff Reduction

(Continued from Page 291)

If such a proposition were made by the United States the great majority of other countries would accept it. The few which may keep aloof would come into line within a few years. One advantage would result, tariffs could not be raised again and the lobbying and wastage of money to "secure influence" by manufacturers who want more and more protection to exploit the home public would stop once and for all. Another point may be considered.

There has been a good deal of talk in Europe, initiated some time ago by Briand, to create a community of interests in Europe. A modified Zollbund was recently proposed by France for the Balkan States, a similar arrangement between Germany and Austria was defeated by France, but there is no telling when European nations may come to an agreement on such a basis thereby excluding the United States. Would it not be better for America to take the initiative and be the leader on this road to recuperation?

Many nations are now threatened with Communism; they can see no way out of the present deadlock. If America were to make this gesture they would take new hope.

I suggest that we pass a resolution appointing a committee whose duty it would be:

First. To write to our Representatives in Washington to engage their interest in a proposal by the United States Government to all other nations to lower all tariffs on imported goods on a reciprocal basis.

Second. To write chambers of commerce and other similar institutions asking their favorable consideration of this proposal and, if approved, their advocacy of same by their Representatives in Washington.



Story of Tonnage Measurement

II. Development of Tonnage Measurements in Various Maritime Nations*

By G. Brick Smith

LONG before King Solomon ruled over Israel, the Phoenicians had developed a fleet of sailing vessels which for many centuries dominated ocean commerce. For the efficient handling of this tremendous fleet they had promulgated shipping laws, probably the first of their kind ever enacted, which were so well devised that they subsequently became the basis for shipping regulations throughout the world, even influencing our more modern laws. These laws included detailed instructions on how taxes were to be apportioned among the ships; in other words, they issued a tonnage law of sorts. Unfortunately, we have no data explaining how this "burden" tax was computed, and whether it applied to all ships of commerce or only to the "Ships of Tyre." We do know, however, that the Phoenician maritime laws, including the tonnage law, were adopted by Italy when that country came to the fore as a maritime power in the 5th century and were developed by her during the seven hundred years, or so, that she ruled the seas.

Neapolitan Carra

Records indicate that the Phoenician tonnage measurements took into account both weight and capacity, but apparently the units used did not suit the various states comprising the Italian Republic, with the result that the original unit of measurement adopted by Naples, the "carra," was recognized neither in Venice nor Genoa, the former having a unit measure called "anfora," the latter a measure called "cantara."

It is possible that the carra, a modification of the Phoenician unit, was used throughout the Italian Republic during her entire sway as a maritime power, and that it was not until her power waned in the 13th century that the units used in Venice and Genoa became of equal importance with the carra. This carra was obtained by dividing the product of the length, breadth, and depth of vessel by a given divisor, the denomination of which depended upon the type and size of vessel to be measured.

At the beginning of the 19th century the method of measurement embodied in the French Napoleonic Act of 1803, the product of the length, breadth and depth divided by 94, was in use in Italy, having been substituted for the old method of measurement; but in 1873 the British Moorsom system was adopted.

French Measures

At Marseilles in very early times, a vessel's carrying capacity was determined by multiplying the length with the sum of the breadth and depth, and dividing this by 200, the linear dimensions used being the "pan," equal to 9.6 inches ($\frac{3}{4}$ of the Paris foot). The capacity of such vessels exporting salt from Bronage and other places between the mouth of the Loire and Gironde Rivers was given in "bronzages," a bronzage being equivalent to about 375 pounds, and 100 bronzages (or one cent) was used in the measurement of Hanseatic vessels carrying salt from these ports. Probably the first

French legislative control of tonnage measurement was attempted in 1681 in "L'ordonnance de la Marine," sponsored by the French Minister Colbert. This ordinance required the official registration of all French vessels and made it compulsory to have these vessels measured by government surveyors, the unit of carrying capacity prescribed being 42 cubic feet.

The French Admiral Bouguer, in his "Treatise on Shipbuilding" issued in 1746, explained this value of 42 cubic feet as having its origin in the transporting of wines by ships and, although actually a measure of capacity, was intended for convenience sake to represent weight—42 cubic feet corresponding to one "tonneau," or 2000 pounds. Henry Chapman, a Swedish naval architect, explained in his book, "Naval Architecture," issued in 1781, that Bouguer's unit of 42 cubic feet could not actually have its origin in the transporting of French wines, as a Bordeaux wine barrel (61.6 gallons) at that time occupied about 11.4 cubic feet and weighed, when full, about 550 pounds. When carefully stowed, four of these barrels occupied 46.13 cubic feet, the weight of which amounted to 2200 pounds. Obviously, therefore, the French measurement of 42 cubic feet must be based on the carrying of the old British "tun," though it was true that the 2000 pounds weight assumed for the 42 cubic feet was actually based on the weight of the full Bordeaux wine barrel, 46.13 cubic feet required for the stowage of four Bordeaux wine barrels, having the same ratio to their combined weight of 2200 pounds as 42 cubic feet bears to 2000 pounds. Subsequently Admiral Bouguer advanced the idea that capacity measurement for tonnage purposes was unsuitable by reason of heavy cargoes failing to fill a vessel's hold, and also due to the fact that ballast, for stability purposes, was normally required in an empty vessel. In consequence, he proposed that the tonnage of the vessel should be measured by the space it took up in the harbor.

About the latter part of the 18th century Mons. Legendre proposed to the French Convention that tonnage be determined by dividing the product of the three principal dimensions, length, breadth, and depth by 94, the dimensions being in metric measurements taken inside the vessel and converted to feet before applying the divisor. This proposal of Mons. Legendre was incorporated in the Napoleonic Act of 1803, the formula corresponding to that embodied in the English Act of Parliament of 1694. The adoption of this formula resulted in dissatisfaction among the French shipowners, as it had among the British; it gave a larger tonnage value than corresponding vessels measured under the Builders' Old Measurement Rule then in force in England.

In 1837, Martin Du Nord proposed that the prescription of conversion to feet be withdrawn and complete metric measurement be required, the formula for this procedure being the multiplying of length, breadth, and depth and dividing the result by 3.8. This revision resulted in a measurement giving a tonnage value 15 per cent. less than if the vessel were measured by the Builders' Old Measurement Rule; this was due to the

*Reprinted from an article in The Bulletin of the Standard Shipping Company based on an address before the Technical Committee of the American Steamship Owners Association.

divisor 3.8 exceeding the 94 used in the English rule by almost 15 per cent. when the dimensions were converted to feet and an allowance made for the difference between the keel lengths used in the French and English formulae. In 1829 the maximum reduction for machinery space was fixed by law at 40 per cent., and in 1873 the British Moorsom system was embodied in a tonnage decree by the President of the French Republic.

Spanish System

Of the European nations, Spain appears to have had the earliest actual legislation for tonnage measurement, tonnage regulations having been enacted in 1590, though there is every evidence that they existed prior to that date. The size of a vessel was expressed in "tonelada," which was also the unit of wine carriage of Spain in the early days. This measurement of vessel's size was based on the product of the length, breadth, and depth, divided by a varying divisor. As the ships sailing from Spain transported little cargo but a great number of passengers, it was necessary to obtain a value of tonnage which would correspond to a cargo vessel of like dimensions, and the tonnage rules of 1590 were therefore kept in force, with slight modifications in 1607 and 1613, until the year 1830, when they were superseded by an act providing that the tonnage of Spanish vessels should be determined on a deadweight basis; that is, by the measurement of the volume of the hull between the empty vessel water plane and the load water plane, a provision for obtaining tonnage similar to that proposed by Bushnell in 1678. However, due to the great difficulty of obtaining correct data, this new law was abolished in 1844 in favor of the 1590 regulations, and these regulations remained in force until 1874, when the British Moorsom system was finally adopted.

The Baltic Lasts

To those continental countries bordering on the North and Baltic Seas, the carrying capacity of a merchant vessel was originally given in "lasts." Last is a Scandinavian word meaning cargo or load, and consequently the ship last was a unit of varying sizes. Originally it was a measure of weight having its origin in the transporting of corn and represented the amount of corn which could be hauled in a wagon drawn by two pair of horses, the estimated weight of which load was 4000 pounds. In several documents from the 12th century, such as the Lubeck Charter of 1188, the term "vas" was used; whether this word is a derivation from the Dutch word "voer," meaning "cart-load," or from the Low German word "vase" meaning "weight," is not known; but it is most probable that the word was of Scandinavian origin. This unit of measurement differed from the English unit in that "last" was originally a measure of weight but was actually used to express volume, whereas "tun," a measure of volume, was used to express weight. As this "last" had no fixed value, it varied considerably with the cargo carried and the port from or to which the vessel sailed; sometimes due to the kind of goods carried, it appeared more advantageous to use a last of small volume, while at other times a last of high value was used to reduce the tolls paid.

For vessels plying between Norway and Holland there also existed a toll on "lastage," but other vessels trading to Holland were taxed on the amount of goods transported. This would indicate that even prior to the 15th century, when the above tax went into effect, the Norwegians had more or less accurate knowledge as to the carrying capacity of their ships of commerce.

In Sweden, in the middle of the 18th century, the carrying capacity of vessels in lasts was determined by measuring the length, breadth, and depth, and dividing their product by a fixed divisor of 200. This gave the carrying capacity in Swedish lasts of 18 ship pounds, there being about 375 pounds per ship pound. This tonnage regulation probably originated in Denmark and was similar to those in use by other Baltic countries and permitted an allowance to be made for carrying cannon.

Before the 12th century Danish trading vessels were taxed according to the number of oars and the amount of "sail spread" used in propelling the vessel; subsequently, they adopted the "last" used by the Hanseatic League.

In 1647, a treaty was drawn up between Denmark and Holland, by which the measurement of seagoing vessels was regulated, these measurements being in Amsterdam measure with varying divisors for each type of vessel. The lasts were wheat lasts or St. Ubis' salt lasts, but for vessels carrying timber, and which by reason of their holds not being filled could not be loaded to their normal draft, a deduction of one-fifth of the vessel's lastage was allowed. To check abuses arising out of the application of this Danish-Dutch treaty, certain definite changes were made by decree and a supplementary treaty was entered into three years later.

Regulations for tonnage measurement were enacted in Denmark in 1830, the unit of tonnage being the "commerz last" of 5200 pounds, corresponding to 82 cubic feet of Danish sea water. These regulations prescribed the measurement of the volume between the empty vessel's water plane and the load water plane, similar to those proposed by Bushnell in 1678. This method was naturally cumbersome and resulted in the Danish surveyors actually measuring the internal capacity of the vessel and subsequently estimating the weight carrying capacity from these internal measurements. In 1867 Denmark adopted the British Moorsom system of measurement.

Though no accurate information exists regarding the tonnage size of the Hanseatic League vessels prior to the year 1368, there is documentary proof that a general tax was levied on seaports based upon the value of the vessels and not the size, this action being taken by the Hanseatic League to defray the expense of their war against Valdemar IV of Denmark. From records available in Hamburg, dating back to 1369 it appears that the largest ship on which these taxes were levied carried 60 "lasts" and had a vessel value of 100 Flemish pounds, equal to 600 Mrks.

In the 12th century the "Lubeck last" appears to have varied between 4480 and 4800 pounds, depending almost entirely on the country with which a vessel was trading, while, according to early Hamburg regulations, the last of that period amounted to 6000 pounds. The number of "last" capacity of a vessel was determined by dividing the product of the length, the breadth, and the depth by 300. After the 12th century the Danzig "rye last" came to be generally used; this measure was $3\frac{1}{4}$ cubic meters (about 114 $\frac{3}{4}$ cubic feet) and weighed over 4000 pounds. In 1815 a Prussian Order in Council prescribed that the standard last should be equal to 4000 Berlin pounds, which was equivalent to 50 Berlin bushels of rye weighing 80 pounds per bushel.

German Hansa Systems

Few records are available covering the early history of the German Hanseatic League ports, but it can be

safely assumed that tonnage regulations were in force in these ports very early in their history. In 1756 the port of Hamburg enacted tonnage regulations governing harbor duties, and in 1819 regulations covering tonnage measurement of vessels used in the port of Hamburg were decreed. This prescribed that the three principal dimensions be multiplied by each other and divided by a divisor, the value of which depended upon the type of vessel.

Subsequently there were several other German regulations issued which varied considerably, and to attain conformity in tonnage measurement the German Baltic States formed a commission in 1849, which commission apparently was in complete accord with the then existing Danish system. This German commission in 1849 recommended that the Danish method, which consisted of space measurement intended to result in a measure of a vessel's weight carrying capacity, be adopted by the German Baltic States. Other proposals introducing a definite empirical divisor to make the German units of measure applicable led to confusion, because almost every State had a definite unit of measurement. Finally the definite divisor of 58 was fixed upon to obtain values given in tons of 2000 pounds, and slight modifications of the Danish method were adopted. In 1873, after the founding of the German Empire, the British Moorsom system was adopted.

As early as 1358 regulations covering the transit by vessels of the River Meuse around Dordrecht imposed a tax on seagoing vessels, the vessels being divided into two grades; namely, vessels of sixty and over "herring" and those under sixty, the value of a 60 herring last equalling 48 Danzig rye lasts.

Dutch Vas

In the Netherlands in addition to the "last" measure there was also used the ton, mostly referred to as the "vas" or "vat," which had its origin in the transport of wines from France. The Amsterdam vat, corresponding to two pipes each of two hogsheads, was equal to 1232 gallons. In the 16th century the term "bronage," of French derivation, was used to express the size of Dutch war vessels, but this was subsequently altered so that the size of such vessels was also expressed in vas.

In the latter part of 1622 the Delegates of Zealand (Holland) complained that there existed an unequal lastage between vessel and vessel, because some used "rye lasts," while others used "oak lasts," the difference between the two amounting to as much as one-third to one-fourth of the vessel's lastage. To avoid such discrepancies, they proposed the adoption of the "rye last," but their proposal and complaint apparently went unheeded.

The earliest legislative regulation of tonnage measurement in Holland apparently dates from 1631, at which time, in an endeavor to prevent tax evasion, it was decreed that all Dutch vessels must be officially measured and marked. This regulation was also adopted to aid in settling disputes between shipowners and the government regarding the amount of compensation due the shipowner for the government's use of their vessels in times of war. Though the enactment was lengthy and elaborate, there seems, however, to have been no definite method prescribed for carrying out the required measurement.

Dutch Capacity Rules

In 1631 the Dutch Privy Council passed an ordinance relative to tonnage measurements of inland water ves-

sels. This ordinance (modified in 1636) stipulated that the capacity of a vessel in lasts should be equal to the product of length, breadth, and depth, divided by 200. This divisor was determined by actually loading the various sizes and types of Dutch vessels then afloat with cannon or cannon balls to a predetermined freeboard mark and then fixing upon the number of cubic feet of vessel volume there was per weight last.

The Dutch East Indies Company's vessels were measured by estimating the number of cubic feet of hold space and the goods which the ships were to carry, 125 cubic feet Amsterdam feet being considered as equal to one Prussian rye last. From records available 108 bushels of Prussian corn equaled one last and occupied almost 124 cubic feet (Amsterdam); but in order to simplify the necessary computations, 125 cubic feet Amsterdam feet were used. Quantities of wheat, rye, and barley were weighed, and upon this basis one last was fixed at 4250 pounds, or, in other words, 34 pounds per cubic foot (1690).

In 1637, by reason of the fixed size and type of vessels built by the Dutch East Indies Company, it was decided that a number of lasts should be fixed according to the length of the vessel, about 90 lasts for 115-foot vessels, to 250 lasts for 160-foot vessels. From experiments conducted by the company upon several of the vessels to determine their actual lastage, the officials arrived at the formula—length multiplied by breadth, multiplied by depth, divided by 200, which, of course, was to be multiplied by 125 to obtain cubic foot measurement. Certain types of their vessels had to have deductions made from the lasts thus obtained due to underdeck cabins, etc., for which a percentage reduction of lastage was determined.

In 1638 the Delegate Councilors complained to the States of the Province of Holland that the government was losing tolls due to the system of measurement then in use at Rotterdam. The complaints were subsequently repeated, and the States of the Province of Holland in consequence decreed that lasts should be equal to 4000 pounds weight of iron.

In the latter part of 1672, or early in 1673, the divisor of 200 was modified to meet the changing conditions and to correct unsatisfactory usage arising out of this measurement. During the year 1672 the Dutch Republic was engaged in war with Great Britain, France, and the Bishops of Cologne and Munster, and at the conclusion of peace in 1678 the old Dutch tonnage regulations of 1636 were again imposed, with slight modifications.

Though no ordinance seems to have been enacted in the 18th century, it is apparent from the records that the French Napoleonic Act of 1803 must have been in force during that period, but in 1819 the Napoleonic Act was replaced by new regulations issued by the Councilor of State, and various types of vessels were grouped and placed in different classes for treatment. The measurements were now made in New Netherland "ells" or meters, and the internal measurement of the vessel was obtained by geometric methods. This method continued in use in Holland with moderate success until 1875, when the British Moorsom system was adopted by the order of the Council.

American Tonnage Rules

The early tonnage laws of the United States were intended to ascertain the deadweight capacity of vessels, and as the space then occupied by superstructure and deck erections was small, the statutes took no account of the erections above the upper deck.

(Please turn to Page 309)

Pumps for Marine Service

By W. Jackman*, O. H. Dorer, and H. M. Chase**

Part V. Condensate, Drain, and Main Circulating Pumps

AS Part V of our reproduction of this excellent paper we have grouped three classes of pumps working at comparatively low heads and under entirely different conditions from the feed pumps treated in Part IV.

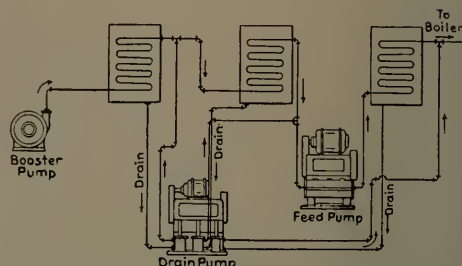
Condensate Pumps

Centrifugal.—The condensate pump is a removal pump. The ordinary centrifugal pump gives a varying head with varying flows, and the head adjusts itself to the requirements of the system. But with the condensate pump withdrawing the water from a fixed vacuum and with constant discharge head, its variable flow eliminates the head characteristic as a flow regulating medium. Instead the submergence level determines how much water shall flow by regulating the absolute pressure at vane inlets and, with this, the velocity and capacity ensuing therefrom. The impeller does not completely fill at all times, and special consideration in its design to provide for these features is necessary to create a smooth running, nonsurging type of pump for all loads. The efficiency consequently is not high. The operating speeds must be very moderate as compared to other pumps for amount of total head.

Stage pressures should not exceed 50 pounds, so that two-stage pumps are frequent. All condensate pumps must be vented from their suction nozzle high points back to the condenser. It is always preferable to employ a hotwell or storage tank beneath the condenser to seal the suction pipe and give the pump an opportunity to adjust its capacity by the suction submergence level, particularly with a pitching vessel. The velocity in the suction pipe should not exceed 3 feet per second. The shortest possible suction line between hotwell and pump should be used, and preferably connected to the bottom of the hotwell. A side connected pipe at the hotwell reduces its potential storage capacity, and a long suction line may permit the pump to draw the water out in gulps.

*Manager, Marine Sales, Worthington Pump and Machinery Corp.

**Paper read at Annual Meeting of the Society of Naval Architects and Marine Engineers, November 19 and 20, 1931.

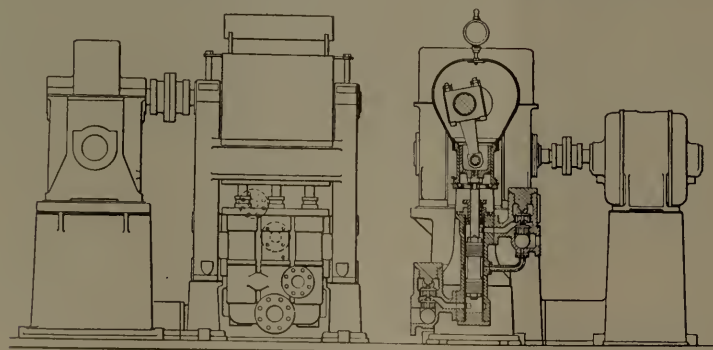


A diagrammatic sketch showing the connection of a vertical triplex pump for feed heater drain service.

Since low submergence heads are demanded on account of head room conditions for the condenser, a vertical condensate pump aids materially in filling this requirement. Small horizontal pumps are applicable in some cases. In capacities below 50 gallons per minute there is no advantage in the vertical pump as to space or head. Stuffing boxes well sealed by water from the pump discharge are required for all condensate services. The vertical pump having only one stuffing box presents additional advantages. Centrifugal condensate pumps that have from 12 to 24 inches submergence are operating satisfactorily.

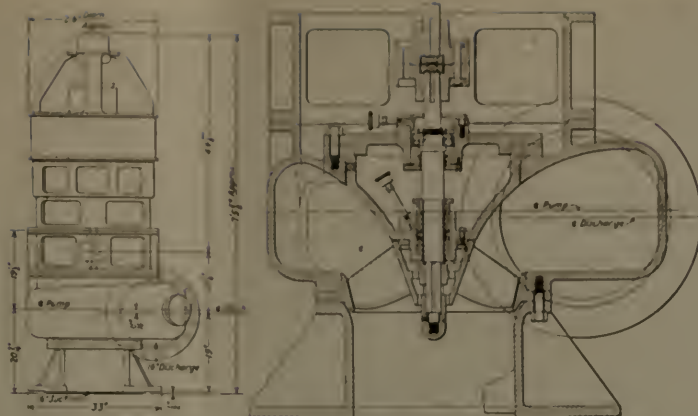
Reciprocating.—For auxiliary condensers or other small capacity installations the less expensive steam pump is to be preferred.

A steam pump for handling condensate should be of the simplex type. The necessity of removing water from a high vacuum requires that the discharge valves of the pump be below the water level in the hotwell. There must be a static head on the suction side sufficient to overcome the friction of the liquid in the pipe, pump passages, the weight of the suction valve, the resistance of the suction valve spring, and the velocity head. Any static head below this requirement will result in vaporization in the pump cylinder. The suction valves should be light and provided with light springs and should have liberal areas. The percentage



Section and elevation of motor-driven vertical reciprocating evaporator feed and drain pump.

Section and elevation of motor-driven vertical mix-flow centrifugal pump for circulating cooling water through the main condensers.



of valve area is affected by the speed and length of stroke of the pump, and should be sufficient to keep the velocity of the liquid through the valves below 2 feet per second.

To insure that the pump fills at each stroke the discharge valves of the pump should be at least 4 to 5 feet below the water level in the hotwell. The pump should be of such size that it will not be necessary to run at over 50 or 60 feet per minute piston speed or over 50 revolutions per minute.

Drain Pumps

Drain pumps are small capacity pumps handling hot water condensed in the heating elements of the feed-water heaters and evaporators. As this is pure water, the discharge may be into some point in the feed line. The pressure against which the pump discharges is dependent on the pressure in the line at point of connection.

Centrifugal.—Heater drain pumps are relatively small and classed in the condensate field because their method of functioning is similar, although the temperature range is of a higher order. These units are usually of the horizontal type because of their small size and are usually employed for the lower pressure work. A special application of a turbine casing drain pump attached to the shaft of a vertical condensate pump is worthy of note.

Reciprocating.—The small capacity and high pressure are advantageously handled by the vertical triplex reciprocating power pump with a close clearance water end. In case of three-stage feed heating, the independent drains from the individual stages may each be connected to one of three cylinders, thus making each drain system a unit and requiring but one pump and motor for the three. Plunger sizes may be varied to suit the capacity and pressure requirements of the different drains. The pump must be set below the heaters to provide 5 to 10 feet static head on the suction of the pump.

A recent design incorporates the evaporator feed and evaporator drain pumps in a single unit of the vertical triplex piston pattern type directly driven through worm gears by a variable speed motor. A description of this pump, which is of an unusual construction, will be of interest. The water cylinders have full length linings in which operates a special piston which is in effect two pistons, the lower one handling the high temperature evaporator drain and discharging against boiler pressure, and the other one handling the

evaporator feed. Each piston has its own set of suction and discharge valves, and the construction permits the placing of the valves close to the piston, reducing the cylinder clearance to a minimum. This is a desirable feature in pumping water of high temperature. The evaporator drain piston is at the bottom end of the pump and its valves are close to the bottom, thus taking advantage of all of the static suction head available. From the cylinder, between the two sections of the piston, a vent to the feed pump suction removes all of the leakage past the pistons and prevents contamination of the evaporator drain from water leaking past the feed pump piston. The piston rod, extending through the stuffing box at the top of the cylinder, is made of a proper size to reduce the effective area of the feed pump piston, so that the same travel of the two pistons will give the proportionate displacement required by the different capacities to be pumped for the two services.

The driving gear is all mounted above the water end and is fully enclosed. Provision is made for automatic lubrication of all wearing parts. Suitably arranged baffles prevent the possibility of lubricating oil from the power end getting into the water end of the pump.

Main Circulating Pumps

Centrifugal.—These pumps are the largest capacity pumps used aboard ship, are of low head (10 to 35 feet) and, as such, are of the high specific speed type. Thus a 10,000 gallons per minute pump at 25 feet head may operate at 700 revolutions per minute at maximum efficiency in a standard double-suction impeller type. These pumps are primarily of the horizontal motor-driven type with horizontal suction and discharge nozzles. Considerable space is required to install them. They are very reliable, efficient pumps provided with horizontally split casings, bronze impellers, bronze casing rings, bronze sleeves and covered steel shafts in the water ways. They are structurally stronger than base plates sometimes demanded, and are preferably set on sole plates directly on the ship foundation. The driving motors should be fastened likewise, and a good flexible coupling should be used to transmit the power. When driven by turbines, the operating speeds are usually too low to secure reasonable turbine efficiency, so that high speed turbines with reduction gears are necessary. In those cases the turbine and gear should form a unit securely bolted to a base plate not extended under the pump. To offset the bulk and space demands of double suction type pumps there are available sev-

eral special designs of circulators. Of these, the so-called Mixflo pump is of conspicuous importance in that it is most satisfactory as a vertical pump and readily arranged for mounting the driving motor directly on its casing. It is a single-suction type having an impeller of a type midway between a ship's propeller and a centrifugal pump impeller. The former is axial flow, and the latter is radial flow as referred to the driving shaft. Mixflo is a combination of both and is diagonal flow. It gives higher specific speeds than can be obtained by a centrifugal impeller, and therefore higher operating speeds for a given capacity and pressure. Its suction, of the end type, therefore is direct and does not require the nozzle to be built around the spiral casing as in the standard double-suction type. Its spiral casing is of smaller dimensions and usually less than two suction pipe diameters across its greatest dimension.

The pump is therefore compact and especially adapted to vertical operation, since its impeller may be attached on the projection of the driving motor or turbine shaft with the casing supporting the driver directly. The use of the spiral casing permits of bearings external to the fluid carrying spaces. Some attention has been directed toward employing these types of impellers without spiral casings, and employing guide vanes above the impeller with an elbow discharge chamber. Such pumps require long shafts under water and should be fitted with an internal bearing. These pumps show additional specific speeds above those obtainable at heads of 10 to 15 feet in the Mixflo class, but it is not definitely established that these specific speeds will give a long life pump at 25 to 30 feet operating head. Indications are that specific speeds in excess of 450 are not obtainable at heads of 25 to 30 feet, without cavitation and erosion.

The Mixflo type pump has a range in specific speed between 225 and 450, and maximum efficiencies of 85 per cent. are obtained in moderate size pumps. For certain service conditions the speed will be between 900 and 1000 revolutions per minute in the Mixflo type. This type, as well as the propeller type pump, has end thrust of considerable magnitude which is successfully absorbed by the use of ball type thrust bearings. The location of the thrust bearing is usually at the end of the driver where it is accessible.

Reciprocating.—Due to the large capacity demands and low heads, the reciprocating type of pump is not recommended because of its price, weight, space requirements, and high operating cost. Its only field is when combined with a reciprocating vacuum pump with a common steam cylinder and used on small condensers for auxiliary service. This is particularly true when the condenser is directly mounted over the two pumps.

Story of Tonnage Measurement

(Continued from Page 297)

Though tonnage regulations had been in force for many years in Philadelphia, the first tonnage law of the United States was enacted in the latter part of 1789. At this period the vessels of the standard type had but one or, at most, two decks, and the law therefore provided for the measurement of single- and double-deck ships only, no mention whatever being made of vessels with more than two decks, nor was there any mention in regard to the measurement of superstructures. By this law, which was re-enacted

early in 1799, the tonnage of double-deck vessels was determined by applying the "Builders' Old Measurement Rule" formula, using a divisor of 95 instead of 94; for a single deck vessel the formula was

$$(L-3/5B) B \times D$$

—, whereas the old Philadelphia rule

95

$$L \times B \times D$$

had used —,

95

The tonnage laws now in force in the United States are based on the provisions of the statutes of 1864, which adopted the Moorsom system of measuring vessels and is practically the same as the provisions of the British Merchants' Shipping Act in 1854. The statutes of 1864 (modified in 1865) did not provide for any deduction from gross tonnage, because gross tonnage and not the net tonnage was the basis of tonnage taxes; and it was not until 1882 that Congress altered this and made net tonnage the basis of taxes.

The treatment accorded superstructures and 'tween deck spaces above the upper deck by the Act of 1865 was, as far as the gross tonnage is concerned, the same as was accorded such spaces by the British Board of Trade, with one important exception. This exception provided that "no part of any ship or vessel shall be measured or registered for tonnage that is used for cabins or staterooms and considered entirely above the first deck, which is not a deck to the hull." At this point it is interesting to note that no change has ever been made in this statute, and, as a consequence, cabins and staterooms constructed above the first deck, which is not a deck to the hull, are still exempted in this country. This clause in the law was undoubtedly intended to apply only to lake steamers and coastwise craft, but as there was no limitation to this effect all passenger vessels were measured accordingly.

The Panama Canal Commission commenting on this section of the law, stated: "The exemption clause of the United States Act of 1865 should have been repealed long ago." The League of Nations Committee commented as follows: "According to the rules in force in one country sundry spaces set apart exclusively for passengers and constructed entirely above the first deck, which is not a deck to the hull, are exempt from gross tonnage."

Net Tonnage Taxes

In 1882 Congress made net tonnage the basis of tax collections, and this statute authorized the deduction of propelling power spaces up to 50 per cent. of the gross tonnage and the crew spaces up to 5 per cent. The tonnage laws were revised in 1895, and the allowable deductions of the deck spaces from the gross tonnage were increased and the British Board of Trade Rule for deduction of propelling power spaces adopted. These changes were made to the tonnage laws, in order to bring those of the United States in substantial accord with those of other countries.

The attitude of Congress has always seemed to be favorable to American vessels in foreign trades, and this attitude has resulted in several advantageous changes to the tonnage laws; for instance, the Act of 1895 increased deductions above deck by repealing the 5 per cent. limit for crew spaces and allowing master's cabin, wheel house, chart house, boatswain's stores, donkey boiler and engine room if connected with the main engine room, and sails stowage up to half per cent. of the gross tonnage, to be deducted; in addition, the light and air, and funnel spaces in enclosed super-

(Please turn to Page 302)

Motor Liner Georgic

New White Star Liner, Sister to the Britannic, Goes into Service

GREAT BRITAIN'S largest motorliner, the Georgic, belonging to the White Star Line and built by Messrs. Harland & Wolff, Ltd., of Belfast, is now in the transatlantic passenger service.

The Georgic, although a sister ship to the Britannic, differs in many important respects, and in her design it will be found that the developments which were incorporated in the Britannic with such marked success have been carried a step further. Built under Lloyd's survey and the Board of Trade rules she has the following dimensions:

Length between perpendiculars . . .	680 ft. 0 in.
Breadth molded	82 ft. 0 in.
Depth molded	43 ft. 9 in.
Gross tonnage	27,000 approx.
Load draft	34 ft. 3½ in.

The hull is subdivided into 13 water-tight compartments, and there is a continuous double bottom arranged to carry fresh water, water ballast, and oil fuel. She has nine complete decks and eight cargo holds for the carriage of dry and refrigerated cargo.

Accommodation

The accommodation provides for 1632 passengers in cabin, tourist, and third class—a slightly greater capacity than the Britannic.

The principal public rooms are on the promenade deck, on which there is a new feature which will be much appreciated—the spacious Palm Court arranged for dancing, lounging, and promenading, undisturbed by bad weather. This Palm Court is also an observation room with glass windows all round. The design is simple as a semi-open air apartment, with a pleasant color scheme.

The "B" Deck Cabin class entrance has been arranged as the center of the "business" side of the passenger life, and all the essential services are grouped together; the purser, chief steward, enquiry, mail and baggage master, and wireless offices are here on the port and starboard sides, with an effectively arranged shop on modern lines near the lift. An arched recess contains a fireplace and recesses for settees and chairs complete the scheme on this deck.

The size of the vessel has given ample opportunities for spacious planning and effective design in the cabin class public rooms, and the impression of restricted space so common on board many ships has been eliminated. Although the free version of the classic decorative styles was so successful in the Britannic, the distinctly modern style through the Georgic results both in added interest and in the preservation of the separate identity of the sister vessels in the eyes of their passengers.

Main Engines

The propelling machinery consists of two 10-cylinder double-acting 4-cycle diesel engines of Harland Wolff-Burmeister Wain type capable of generating 10,000 shaft horsepower each. The cylinders are cooled by fresh water and the pistons are oil cooled, while all the auxiliary machinery is electrically driven. The two main engines are of air injection type but have not attached compressors, these being arranged in the compartment forward of the main engine room. One



A quartering view of the new motor liner Georgic just after her trials.

small steam driven emergency compressor is also fitted. The injection air supply is maintained by four independent compressors, each driven by a 4-cylinder trunk type engine of Harland & Wolff type. These units also supply air to four reservoirs for maneuvering purposes.

There are two Clarkson thimble tube exhaust gas boilers for the main engines on the Georgic, also two smaller boilers for the auxiliary engines. This is the largest marine waste heat installation afloat. The two main engine exhaust gas-fired boilers will generate steam at sea, and the two auxiliary engine exhaust gas-fired boilers and two cylindrical single ended boilers, oil fired only, are available for generating steam either in port or at sea for heating and cooking purposes.

Power cylinders of the main engines are 33 inches bore and 63 inches stroke. Rated power is delivered at 102 revolutions per minute, giving a piston speed of 1070 feet per minute. The main indicated pressure at rated output is 90 pounds per square inch. Steam raised by the exhaust boilers is at 100 pounds pressure and the total capacity is 13,600 pounds per hour. This capacity in a normal oil-fired boiler would require approximately 13 tons of oil fuel a day. The service speed of the Georgic is 17½ knots. At this speed she uses approximately 94 tons of fuel per day and her fuel tanks give a capacity for 23 days at full power, so that she takes on diesel fuel at New York for the round trip.

Auxiliary Machinery

The Georgic has a powerful electrical installation for auxiliary machinery and "hotel" loads, the supply for which is taken from four diesel engine driven generators having a combined output of 2,000 kilowatts installed in a separate compartment forward of the main engine room. All the engine room auxiliaries, of which there are over 70, are electrically operated, the individual horsepower for driving the pumps, ranging from 100 down to 2½. The connected lighting load is equivalent to over 7000 30-watt lamps. A 75-kilowatt diesel-driven emergency generator, situated on the upper deck, supplies lighting and power for all essential services, and for any reason the main sets are out of action.

A New Quarantine Tug

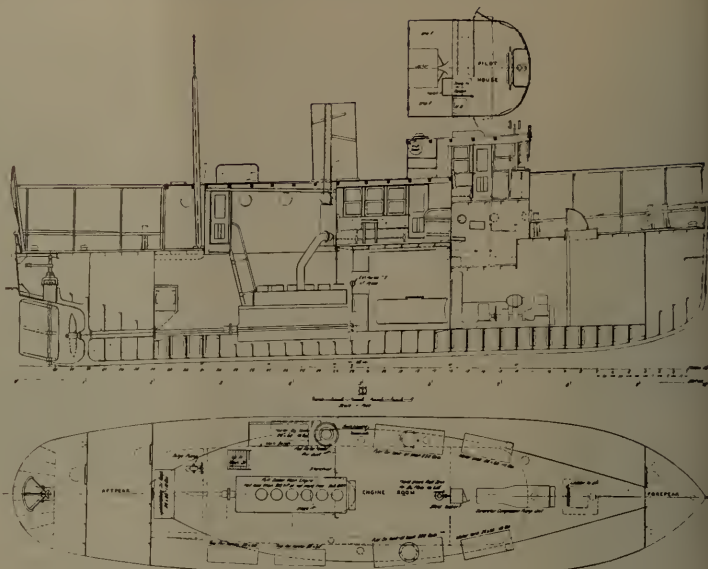
A NEW tug now under construction at the Spedden Shipbuilding Company, Inc., Baltimore, Maryland, is to be used by the Foreign Quarantine Division of the Public Health Service, and will be attached to the Quarantine Station at New Orleans, Louisiana. She is designed for general quarantine work, including principally the transportation of Public Health Service doctors and inspectors to incoming ships.

With 71 feet over all length, 16 feet moulded beam, 10 feet 10 inches depth, she will have a load draft of 8 feet and was designed by the Public Health Service Naval Architect P. W. Clark.

On the main deck there will be a raised pilot house forward with hospital compartment below, aft of which will be a saloon for officers or passengers, followed by a trunk over the engine room and terminating in a freight and stowage compartment at the stern. The entire hull between peak bulkheads will be used as an engine room. No sheathing will be fitted in the superstructure except that necessary for window and door casings. The type of stern to be used, which was developed by the Public Health Service, is one designed to fulfill the particular needs of that Service. It has previously been used extensively in the wooden vessels of the Quarantine Fleet, but this is the first steel vessel to have this particular design of stern.

All construction will be steel throughout, with the exception of hull plates, which will be genuine wrought iron containing no scrap and furnished by A. M. Byers Company. All hull rivets will also be genuine wrought iron containing no scrap and will be furnished by Ulster Iron Works. The use of wrought iron in hull plates and rivets is typical of Public Health Service construction as it has been found to materially minimize difficulties due to electrolytic action and corrosion under water.

The propelling machinery will consist of a 6-cylinder direct-reversible 10 x 12½-inch Fairbanks-Morse full diesel engine. The auxiliary generator-compressor-fire pump unit will also be supplied by Fairbanks, Morse & Co. All electricity will be 110-volts direct-current, which will be required only for lighting purposes; and this unit will be arranged for either air or hand starting. The heating system will be of the hot water type. The propeller will be a 3-blade, bronze wheel, furnished by the Columbian Bronze Corporation.



Inboard profile and machinery arrangement plan of the new quarantine tug designed for New Orleans service.

empted up to one half per cent. of the gross tonnage. When the longitudinal ship came into vogue, the rules were again revised to do away with the floor allowance in oil tankers. At that time the law was interpreted to exempt from measurement all double bottom tanks, and thus we arrive at the present day United States tonnage laws.

The following concise definitions clearly describe the various classes of tonnage measurement in general use.

Deadweight Tonnage is the number of tons of 2240 pounds that a vessel can transport of cargo, stores, and bunker fuel. It is the difference between the number of tons of water a vessel displaces light and the number of tons it displaces loaded.

Cargo Tonnage is based on weight or measurement. The weight ton in the United States and British countries is the gross ton of 2240 pounds, whereas in France and other countries having the metric system the weight ton is 2204.6 pounds. A measurement ton is usually considered as 40 cubic feet, though in some instances, for special reasons, a larger number of cubic feet is assumed.

Gross Tonnage refers to the vessel and not to the cargo. It is determined by dividing by 100 the contents of the vessel's closed-in spaces in cubic feet, less those spaces exempted by law.

Net Tonnage is the vessel's gross tonnage minus deductions of space occupied by crew, machinery, engine room, and fuel and for navigation purposes. A vessel's net tonnage is the space presumably available for the accommodation of passengers and the stowage of cargo.

Displacement is the weight of a vessel in tons of 2240 pounds. The "light" displacement is the weight of the vessel without stores, bunker fuel, or cargo; whereas the "loaded" displacement is the weight of the vessel ready for sea, including cargo, fuel, and stores.

Tonnage Measurement

(Continued from Page 300)

structures above the engine room, were allowed to be included in the gross tonnage and deducted as part of the engine room allowance. In 1909 hatchways were ex-

Now Metalspray in Marine Service

THE De Laval-Pacific Company has recently consummated exclusive sales and distribution arrangements with the Metal Spray Co., Los Angeles, owner and manufacturer of Metalspray, for territory embracing the Pacific Coast, Alaska, Hawaii, Japan, China, and the Philippines.

The process of spraying molten metals on to other metals or materials is not new. It has been tried with varying success and by many different methods and appliances and all experiments, however successful, simply proved that, were the process and the means ever brought to the point where practical and economical commercial operation was possible, a vast field of usefulness was clearly indicated.

This development has now been attained, to a unique degree, with the Metalspray process, using the Metalspray Gun. Both process and gun have passed through the inevitable experimental and developmental stages; both have received the invaluable aid offered by tests and suggestions of the research and operating departments of some of the largest industrial and engineering organizations in the West.

Special and fully equipped commercial custom shops have been established in both San Francisco and Los Angeles. There are adequate facilities available both for shop work and for outside job work.

Now, the De Laval Pacific Company offers the Metalspray Process



The Metalspray Gun mounted in the tool rest of a lathe for spraying on revolving shafts.

and Metalspray Gun knowing that, in operation, they will completely justify their intensive research and the expressed confidence and support of an impressive list of competent and practical authorities.

This announcement is of peculiar interest to marine engineers, naval architects, and ship operators on the Pacific Coast:

First, because of the many important applications of the metal spraying process in shipbuilding, ship maintenance, and marine machinery. These applications include the building of worn shafts, the coating of corroded and pitted propeller blades, the permanent protection of all classes of metal surfaces against corrosion, and the production of highly decorative and fire-resistant surfaces on wood and other materials.

Second, because the intimate con-

tact of the De Laval Pacific Company with marine interests throughout this territory will make this process readily available for many marine uses in all important Pacific ports.

In the near future Pacific Marine Review will carry a series of articles describing in detail the Metalspray Process and Metalspray Gun and their application to marine machinery and marine construction.

Trade Literature

Marine Electric Company, 149 Russell Street, Portland, Oregon, with a branch in Seattle, has recently published a complete general Catalog, No. 32. This firm is dealer and manufacturer of a line of marine supplies and equipment, export and import, and carries its products under the trade name of Mareleo Fittings. A complete line of electrical fittings and other marine equipment and supplies for use aboard all types of vessels domestic and foreign is carried, and an expert engineering service is in back of all quotations and installations. Copies of the catalog may be had by addressing the editorial department of this magazine.

Engineering Achievements, 1931. The annual report of the Westinghouse Electric & Manufacturing Company covering engineering achievements in 1931 has been printed in booklet form. The booklet contains 40 pages, is profusely illustrated, and covers every industry and application of electrical power.



The Metalspray Gun being used by hand to coat the inside of a retort.

An Interesting Marine Diesel Engine Repair

THE resourcefulness and ingenuity of the marine engineering fraternity at San Francisco were again demonstrated recently in the repairs effected on the diesel engine of the British motorship Silverhazel. This vessel, built by J. L. Thompson and Sons in 1927, is 425 feet long, 58 feet 3 inches beam, 38 feet 6 inches depth, and carries 9000 tons deadweight. She is single-screw and was engined by Wm. Doxford and Sons with a 6000 indicated horsepower 4-cylinder Doxford opposed-piston diesel engine.

Six main bearings support the built-up crank shaft of this engine. The crank shaft is composed of six flanged spools forming the journals in the six bearings; four three-throw cranks, each of which takes the three connecting rods operated by each cylinder; and one

The flange from the broken journal.



crank between the two center bearings for operating the connecting rod that drives the scavenge pump. The journals are 20 inches in diameter, the flanges 38 inches diameter, and the entire construction of the engine is very rugged and heavy.

For some reason, details of which have not yet been developed, the forward flange on No. 3 journal carried away and the resultant strain badly cracked the No. 3 bearing and its supporting pedestal girder. Fortunately, the engineer on watch was able to instantly shut down the engine, avoiding further damage. This accident occurred during the latter part of May and while the vessel was en route to San Francisco. She was towed into port and bids for repairs were called. General Engineering and Dry Dock Company was awarded the work on a 14-day guarantee, work on the ship to be done at the pier while cargo was being discharged and loaded.

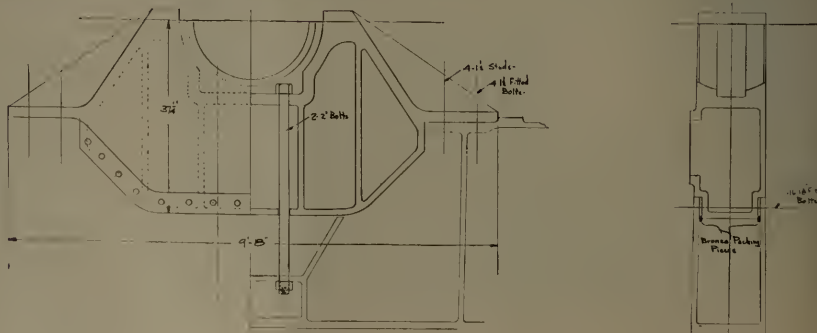
The work consisted in removing No. 3 journal, in removing the cracked part of the No. 3 girder pedestal, in designing, building, and installing a satisfactory girder pedestal patch, in making and installing a complete new No. 3 bearing, in fitting and aligning No. 3 journal and coupling bolts, in fairing up rods and repairing and refitting all oil pipes in way of the damage, and in holding a four-hour dock trial run after which the No. 3 girder repair must satisfy owner and Lloyds surveyor.

In order to facilitate stripping, the twisted off flange with its three-throw crank attached was blocked up to alignment and the break was electrically welded temporarily so that the jacking engine could be used in turning the cranks to the best positions.

As will be noted from the drawing and the pictures



Above: The cracked pedestal girder removed from the bed plate of the Doxford diesel engine on the motorship Silverhazel. At right: Design for patch casting to take the place of this cracked pedestal.



reproduced herewith, the cracked girder, which is an integral part of the bedplate casting, presented a serious problem in patchwork. The cracked portion was drilled and chipped out along a carefully located line and removed to the shop. From careful measurements and templates, a pattern was made for a new casting to be used as a patch piece for the support of the new No. 3 bearing. This casting was finished to fit the webs of the bedplate, and the bedplate and casting were drilled for bolts as shown in the drawing. A very particular piece of machining in this connection was the boring of the spherical surfaces that form the seats for the self-aligning bearings. When the patch casting had been installed, the fit was so perfect that no spot could be found where a 0.002-inch feeler could be introduced between the bed plate and the patch.

After the four-hour dock trial, a careful examination of the repair was made and it was found satisfactory in every way. The work was finished on the dot in fourteen calendar days, and another good record was hung up for ship repair methods on San Francisco Bay.



A view of one of the crank pits of the diesel engine of the motorship Silverhazel showing the finished patch in place.



Fitting the broken girder to take the patch.

vessel would not sink to the bottom provided the depth is sufficiently great. Others claim that, once a vessel sinks below the surface, it will continue to sink until it reaches the bottom regardless of the depth.

The belief, on the part of a few, that a sunken vessel will not ultimately reach the bottom of the ocean is due most probably to the failure to distinguish between the pressure and the density of water.

While the density of sea water varies somewhat in different oceans, as well as in different parts of the same ocean, due to currents and to other natural causes, the weight of one cubic foot of sea water at or near the surface averages nearly 64 pounds. Since water is only very slightly compressible, its increase in weight due to pressure at great depths is rather slight. At a depth of 6 miles below the surface its weight is about 67 pounds per cubic foot.

Now the weight of steel is 490 pounds per cubic foot and, since any submerged object is buoyed up by the weight of an equal volume of the displaced liquid, it is at once apparent that should the increase in the density of the water continue to vary directly with the distance below the surface, an ocean depth of more than 850 miles would be required in order that a steel vessel could remain suspended in the water.

Should a steel vessel at the time of sinking have only a very slight amount of negative buoyancy due to a sufficient number of compartments still being intact, the water pressure would crush their structure before a depth could be reached at which the increased density of the water would balance the surface negative buoyancy.

We therefore must conclude that any steel vessel which is sufficiently damaged to sink beneath the surface will continue to sink until it reaches the bottom in any depth of water now known or ever likely to be found.

[Standard Shipping Bulletin]

How Deep Will She Sink?

ALMOST invariably when vessels are lost at sea the question arises as to whether or not a vessel would actually sink to the bottom of the ocean. Some argue that due to the enormous pressure of the water and to its increased density at great depths a



Marine Equipment

THE PALLET SKID ~ IMPROVED STEERING GEAR
NEW DIVING HELMET ~ COMPOUND LUMBER FOR PANELS

An Improved Skid System

ELWELL-PARKER Electric Company has recently designed a new style of fork truck which has as the supporting members of the skid a fork with two or more prongs which takes the place of the ordinary lifting platform.

This fork truck differs from the lift truck in the method of carrying the load. On the lift platform type of truck, the load is carried between the front and rear wheels on the platform itself. With a fork type of truck, the load is carried outside of the wheelbase on the forks. With the fork truck, therefore, the wheels are not in a position to interfere with the load carrying arms, so that these arms can be dropped almost to the floor level, losing but two inches of space, this two inches being the thickness of the tines of the fork.

While it is possible to handle standard skid platforms by means of these forks, in order to take full advantage of the possible savings it is necessary to use with fork trucks a special type of skid or what might better be termed a "pallet." These pallets may be made entirely of wood with a 2-inch clearance between "the table top" and the lower cross ties so that the operator of the truck can insert the chisel edge of the fork under the pallet. The operation of picking up a load of from 1000 to 6000 pounds is similar to that of a man picking up a light bundle of sticks to be carried in the arms against the chest.

While the standard skid platform method has many advantageous features when compared with former methods, nine distinct additional advantages are to be had with the pallet system. These are:

1. The pallet, being but 4 inches high, as compared with the 14-inch over-all height and 12-inch under clearance of a skid, loses 70 per



An Elwell-Parker elevating truck stacking crates with the new "pallet" skid.

cent. less storage space than the standard skid.

2. A pallet costs 80 to 88 per cent. less than a skid. Skids as constructed are low tables or bridges and are ordinarily supported at the four corners with the top 14 inches above the floor. The normal size is in the neighborhood of 30 to 60 inches. The pallet is about the same size, 4 inches high, but supported the entire length of each side by wooden side rails with an additional center rail running full length of the pallet, cutting the unsupported span in two. The cross slats of boards run full length of the pallet and are nailed to the under side of these cleats or rails so that either side may be used as a loading surface. This makes possible the use of

much lighter material and less expensive design and simplified construction, cutting the cost of a pallet to one-fifth or less than that of a well-made skid.

3. The weight of the pallet is such that a man can easily lift an empty one by hand.

4. Empty pallets are stored in 70 per cent. less space than skids, and the nesting of pallets is accomplished by laying one pallet on the other while with skids care must be taken in the stacking, since the spread of the skid legs generally matches the skid platform width for size.

5. The cost of pallets is so low that they can be used as a non-returnable shipping platform on which goods may be shipped to the buyer, thus saving the cost of more expensive cases. The material to be shipped is usually bound to the pallet by the use of steel banding and special tying devices now generally used for the purpose.

6. In the storing of the load on a pallet, an even distribution of the weight on the packages of the supporting unit load is accomplished. Material can then be stacked to the capacity equal to the crushing strength of the containers or material handled, provided the height of the load is within the limit of the stacking height of the truck used.

7. Since the spread of the forks on the truck is easily adjusted or extra forks of varying sizes easily interchanged, pallets of various sizes can be used with the same truck. It is not necessary to standardize on one size for the entire materials handling system. As a matter of fact, fork trucks will handle skids until the latter are worn out and gradually replaced by the space-saving pallets.

8. Pallets rest flat on trailers and provide a secure base for transport-

for loads for long distances when the fork truck, after loading the trailers with pallet loads, is used as tractor.

Pallets and "sling boards" for ship-side handling of materials are almost identical in construction. The major difference is in the addition of hooks or rings fastened to the pallet corners for hooking to the ship's tackle.

The fork type of lift truck is manufactured in capacities of from 1000 to 6500 pounds, sizes being stepped up in 1000 pound ranges. In addition to picking up the load on a pallet, provision is also made for carrying the load tilted backward toward the operator of the truck. The main advantage of this is in the support given to the weight on the pallet and on the rack or backing of the upright provided with the truck—the load being held in a vee by gravity, so that it is not easily dislodged when turning corners or suddenly applying the brakes. Tilting the load also swings it back over the wheel base, making the truck itself much more compact. Tilting also shortens the over-all length and lowers the over-all height. By means of telescoping uprights even further economies are available.

An Elwell-Parker fork truck equipped with telescoping uprights can enter places with low headroom, such as freight cars or low doorways; it can pass under balconies and low pipes but at the same time the upright can be pushed high enough to stack material to a height of 25 feet if necessary. By this means storage space is increased from 100 to 300 per cent. without any increase in floor area, because all available headroom in the warehouse can be used to advantage.

Elwell-Parker products are handled in California by Ira G. Perkins and in the Pacific Northwest by the Colby Steel & Engineering Company of Seattle.

New Type

Diving Helmet

THERE have been a great number of diving helmets made in various parts of the world, but most of them have disadvantages. First, the pumps do not deliver sufficient air. Second, the communication between the diver and his assistant is usually through signaling by jerks on a rope, which is not



The Wilber diving outfit ready for operation.

satisfactory. Third, with a straight diving helmet, the diver must get wet. If the water is cold this latter amounts to a serious disadvantage, as one cannot remain long under water under these conditions. Also, diving helmets are usually equipped with a window, the glass of which is too easily broken. With each of these considerations in mind, G. C. Wilber of Oakland, California, decided to construct a suit which he believed would overcome all drawbacks.

This outfit consists of a helmet, a fleece-lined rubber suit, a large double-acting pump, telephones for two-way talking, a lead belt with a quick release buckle, an easily attached air hose, and a manila rope life line.

The total weight of the apparatus which the diver wears is approximately 150 pounds. However, when under water the diver only weighs about thirty pounds on the bottom, and the suit is said to be very comfortable.

The body of the helmet is made from a steel water tank. This tank is cut with an acetylene torch to fit the shoulders. Wide shoulder pads are welded into the shoulder contact to distribute the weight of the helmet. A large hole is cut in the front for good vision range, and this hole is covered with a sheet of celluloid 1/8 inch thick. This makes an almost unbreakable window. Then a handle large enough for two hands to grasp is welded into the top of the helmet. An ordinary garden hose coupling is welded into the top of the helmet. This is where the air hose connects. The helmet is also fitted with two removable lead weights which total 80 pounds. This makes the total weight of the helmet 95 pounds.

The water proof suit consists of a single-piece garment made of fleece-lined canvas-backed rubber

with an opening at the neck to admit the diver and with rubber boots vulcanized on from the knees down. When the diver is in the suit the neck or top is strapped around the diver's chin. Since the water is always at the level of the diver's shoulders this collar of the suit always projects above the water level. One may enter the suit with an ordinary street suit on, stay under the water as long as he likes and emerge without getting a bit wet.

The diver wears head phones and there is a microphone in the helmet. The man at the pump also wears head phones and is equipped with a microphone. This allows two-way communication. The battery which supplies the current is permanently attached to the pump. The wires carrying the current go down inside the air hose to the helmet.

Should an emergency occur, the diver may throw off the helmet, drop the lead belt and the buoyancy of the suit will carry the diver to the surface from any depth.

This outfit may be used to depths of fifty feet. It can be used for a great number of things, some of which are: recovering lost articles, making repairs under water, abalone fishing, collection of under water specimens of rock, plant, and animal life and even the mining of gold in the deep holes of gold-bearing streams. The inventor and associates are now engaged in a practical demonstration of this equipment in gold-bearing streams of northern California.

Electric Cookery

Aboard Ship

THOSE who follow the sea know the value of electric cookery, say officials of Edison General Electric Appliance Company, Inc., which has just been awarded contracts for electric galley equipment on a large number of mercantile vessels and United States navy cruisers. The company, makers of Edison heavy duty cooking equipment and General Electric Hotpoint ranges, has obtained orders for the U.S.S. New Orleans, U.S.S. Minneapolis, U.S.S. San Francisco, and U.S.S. Astoria, which are under construction at the Brooklyn, Philadelphia, Mare Island, and Puget Sound Navy Yards.

Equipment contracts also were obtained for the new aircraft carrier, U.S.S. Ranger, building in the yards of the Newport News Ship-

building and Dry Dock Company and also for another new cruiser, the U.S.S. Tuscaloosa, building in the yards of the New York Shipbuilding Company. Work has already started on the equipment, all of which will be shipped this year.

In addition to government marine business, contracts were obtained for complete electric galley equipment on the four Scantic Line ships of the Moore and McCormack Company.

Electric galley equipment is being furnished to the two new United States Lines passenger liners, Manhattan and Washington, largest vessels built in an American shipyard. The first of these, the steamship Manhattan, will make her maiden voyage in August. Seventeen of the nineteen ships built in this country last year had galleys furnished with Edison General Electric Appliance equipment.

Phemaloid Compound Lumber

PHEMALOID panels, the new compound lumber product of the Haskelite Manufacturing Corporation, are attracting a great deal of attention from marine users of panels and plyboards. This new product is electrically processed with the new phenol-formaldehyde colloidal resin, a binder that is water-proof, fire-resistant, and antiseptic and therefore proof against mold and vegetable fungi, which are the most active causes of rot in wood construction.

Phemaloid panels are cross-laminated in natural wood, this construction increasing the strength of wood many fold. The wood used is either prefinished with the phenol-resin in combination with fabrics or is finished on the job with paint or varnish made with the same resin. This finish is amazingly resistant to exposure and can be easily renewed. The panel lumber may be sawed, shaped, and painted by an ordinary mechanic and it can be produced in panels "as large as a house" or "as small as a postage stamp." Thus the four walls of an ordinary room mean four panels with no joints; the side of a freight car, two panels; the roof or side of a bus or van, one panel. Many such applications illustrate the economy to be gained through the elimination of joints.

These compound lumber panels are produced in huge hydraulic presses by a combination of electric

Tensile Shear Tests

Glue	Thick- ness inches	No. of Plies	Wood	No. of Tests	% H. O.	% Glue Failure		Strength lbs. per sq. inch		Average Value Strength lbs. sq. in.		
						Dry	Wet	Dry	Wet	Dry	Wet	Type of Glue
Phemaloid	3/64	3	Spruce	5	6.3	12	100	442	270			
"	3/64	3	"	5	6.3	8	100	443	260			
"	3/64	3	"	5	6.3	24	100	468	262			
"	3/64	3	"	5	6.7	39	100	480	198			
"	1/16	3	"	5	6.7	56	100	392	240			
"	3/64	3	Mahog.	5	3.5	0	10	300+	230	407	256	Phema- loid
"	3/16	3	Birch	5	2.6	62	14	372	260			
"	3/16	3	"	5	2.0	4	31	391	247			
"	1/4	3	Poplar	5	1.9	94	100	312	182			
"	7/32	3	1/12 Bir.	5	4.7	10	56	547	390			
"	3/16	3	Birch	5	1.9	33	99	331	280			

Table showing the results of tensile shear tests on Phemaloid Compound Lumber panels built up of various woods.

heat and pressure. The layers of wood with resin spread between adjacent layers are placed on large trucks. Between the panels is a series of electrically heated plates. The truckload of panels is run into the press and pressure is applied by the hydraulic rams. A temperature of over 300 degrees Fahrenheit is maintained electrically for 15 minutes, during which time it has been demonstrated that the resin and heat thoroughly penetrate the wood of the panels, destroying all fungus growth and fusing the layers together in a permanent unit. One press has a capacity for 70 panels 10 feet square and 3/4 inches thick in one 20-minute operation.

There are many advantages in this method of producing wood panels.

The combination of high temperature and pressure produces a flat, smooth panel of uniform thickness and of such surface texture as to eliminate sanding in most cases.

In woods such as pine and Douglas fir the ordinary splintering effect is almost eliminated by this method.

It is a proved fact also that this process almost entirely eliminates the stresses between adjacent plies of wood.

Phemaloid resin has a tensile strength of approximately 10,000 pounds per square inch. It is practically insoluble in any liquid. Its strength gradually increases with age. It has a greater power of penetration than any other binder known to the industry. It effectively prevents flow of moisture through a panel.

Phemaloid compound lumber has been proved on actual tests to withstand heavy impact or blows which would severely dent sheet metal or badly split any ordinary lumber panel. It is predicted that these panels will find a large use in the decking, hulls, partitions, bulkheads, siding, and ceiling of pleasure craft and in the joiner work,

bulkheads, ceilings, doors, paneling, and partitions on shipboard. The table herewith shows tensile shear tests on Phemaloid Compound Lumber built up of various American woods.

Northern Pump Nitalloy Series

THE Northern Pump Company has recently developed a new line of rotary pumps which are termed "nitalloy series." Nitalloy steel is the hardest metal known, being nearly equal to the diamond in Brinell hardness (1100 Brinell) and approximately twice as hard as tool steel. Because of the extreme resistance of this nitalloy steel to abrasion, pumps made out of the steel will last indefinitely even when there is a small amount of foreign matter or grit in the pumping system.

The design incorporated in these nitalloy pumps is unique and really revolutionary in the pump industry. The construction consists of the use of laminated pieces of nitalloy steel held together by ground dowels. The nitalloy series at the present time covers three different series-sizes, namely XA, XD, and XE, ranging in capacities from 1/10 to 42 gallons per minute at 1200 revolutions per minute.

For nonlubricating oils and liquids the pumps are equipped with nitalloy plate bearings. Roller bearings are used for handling clean lubricating oil and are good for pressures up to 1600 pounds on continuous service.

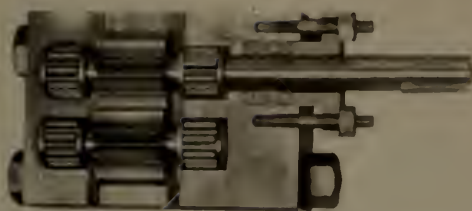
Because of the high efficiency and wear-resisting qualities, these nitalloy pumps with roller bearings are ideally suited for installations on hydraulic hoists, lifts, cranes, conveyors, bulldozers, hydraulic steering gears, hydraulic snow-plows, presses, hydraulic stokers, machine tools, and hundreds of other hydraulically operated mech-

autisms. The nitralloy pumps with roller bearings make ideal lubricating oil pumps for diesel and marine engine lubrication.

These same nitralloy pumps built with nitralloy bearing plates will find a ready market for handling fuel oils in connection with burn-



A sectional view of the roller-bearing type of the Northern Nitralloy Series pump.



A sectional view of the plate-bearing type of the Northern Nitralloy Series, Northern pump.

ers transfer service of all kinds, and in fact for pumping any non-oxidizing liquid.

Pumps and parts are carried in stock for prompt shipment. Incidentally the Northern Pump Company is one of the largest users of nitralloy steel in the United States. This firm is taking a bold step in going ahead with this new development program for the improvement of rotary pumps, but they are fully convinced from the unusually wide interest shown by actual and prospective users that this economic product will bring in returns in spite of existing conditions.

The De Laval-Pacific Company represents the Northern Pump Company for all industrial and marine sales on the Pacific Coast, Alaska, and Hawaii.

Winton Diesel Generating Sets

THE modern transatlantic liner Scarpenn, first of four passenger and freight boats recently added to the American Scantic

Line, a Moore and McCormack subsidiary, left New York City early in June on her first voyage to Russian and Baltic ports. The Scarpenn, a sturdy ship of 11,450 tons, is a reconditioned steel freighter and represents the first venture of the firm of Moore and McCormack into the passenger carrying trade. Her modern accommodations and appointments portray the transformation that can be effected by careful planning, tasteful designing, and smart reconstruction. She is one of four similar vessels selected for conversion into modern passenger and cargo vessels which are to be used to maintain a direct, economical, and convenient service between New York and Copenhagen, Gdynia, Stockholm, Helsingfors, and Leningrad. The other vessels are the Scanyork, Scanmail, and Scanstates. Total cost of reconditioning the four vessels is \$1,500,000. The work was done by the New York Shipbuilding Company at Camden, New Jersey, to the designs of George C. Sharp, naval architect of New York.

Included in the new equipment installed in each vessel are two modern Winton-diesel generator

sets, each developing 75 kilowatts at 350 revolutions per minute, which will be used as main generating sets, furnishing power for the electric galley, refrigeration, lights, and various other purposes. These are 6-cylinder, airless injection units of the latest type, in keeping with the modern equipment used throughout.

Dr. Shush Model E W

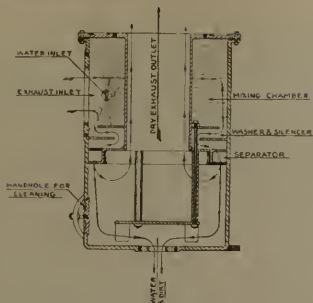
BY combining a water scrubber and a Maxim silencer in one corrosion-proof unit, The Maxim Silencer Company has produced a compact, reasonably priced silencer that not only makes the exhaust of a diesel engine quiet, but also makes it sparkless and clean. On gasoline and gas engines, it will eliminate the possibility of exhaust line explosions.

It is expected that it will be ideal for installation on the exhausts of diesel engines used in tankers, where sparks must absolutely be eliminated. It will make the exhaust of a diesel engine as inoffensive, as far as sparks and dirt are concerned, as the exhaust of a gasoline engine.

This new silencer is called the Model EW. It is built of cast iron throughout, making it corrosion-proof. Only a moderate amount of water is required, the cooling cir-



The eight Winton diesel generating sets recently sold to the American Scantic Line by the Winton diesel engine company for installation in the four reconditioned passenger and cargo vessels Scarpenn, Scanyork, Scanmail, and Scanstates.



Sectional elevation of the new Maxim combined water scrubber and silencer for diesel engine exhaust.

culation being sufficient. It is smaller and lighter, size for size, than the standard dry type Maxim silencer.

Round-the-World with Frigidaire

FRIGIDAIRE Corporation is sending its 2,250,000th electric refrigeration unit on a triumphal tour of the world via the Dollar Lines.

The household model which is being sent around the world came off one of the company's eight assembly lines on July 8 and was shipped at once to San Francisco to sail July 22 on the steamship President Pierce. It was installed in the main dining room of the liner and will be in actual operation during the voyage, according to Hugh Mackenzie, general passenger agent.

At each port of call, the Dollar Lines, working with the local Frigidaire sales organization, has arranged for special port ceremonies, heralding the arrival of this refrigerator. After the tour, the round-the-world Frigidaire will be sent to Chicago where it will have a place of honor in the General Motors exhibit at the World's Fair.

The round the world refrigerator bears a bronze plaque, with the words "2,250,000th Frigidaire." A registration book for signatures of those who visit the exhibit while the ship is in port has been provided.

When the refrigerator left Dayton, Ohio, on its tour of the world, E. G. Biechler, president and general manager of the company, said:

"In sending the 2,250,000th Frigidaire on tour we are paying recognition to the 16 years of progress and achievement that has been

made by our entire organization in manufacturing and selling, at home and abroad.

"By adhering to the 2-cylinder principle in both our household and commercial installations we have



E. G. Biechler, president and general manager of the Frigidaire Corporation, points with pride to the production record of his firm.

accomplished much in paving the way for future business. The new air conditioning equipment, which possesses extraordinary cooling capacity is a 2-cylinder development. This particular branch of the company's business is showing a tremendous growth, and gives promise of a bright future."

Trade Literature

"You Can Make it for Profit."

We recently received notice of a booklet which has been published by the National Committee of Wood Utilization of the Department of Commerce. The booklet, as the title shows, is primarily intended for use by men who are at present unemployed and who are looking for odd jobs which they can do around the house and in the house to improve their property and to make a little extra money. It occurred to us that there are many articles and fixtures described in this booklet which might easily be made at sea by anyone who is handy with tools and who takes pleasure in fixing up quarters aboard ship to make them more comfortable and home-like—and maybe sell to shipmates to take home as presents to the folks.

The title is "You Can Make it for

Profit," and it can be obtained from Superintendent of Documents, Government Printing Office, Washington, D.C. Price 10 cents.

Nickel Alloy Steel Castings.—Bulletin No. 8-A is ready for distribution by the International Nickel Company, 67 Wall Street, New York.

RecOroD for Uniformity is the title of the catalog published by The Bastian-Blessing Company describing the company's line of welders and welding equipment.

Stainless Steel Motor.—The Lincoln Electric Company has issued a leaflet describing its Line-Weld Type E induction motor, constructed of stainless steel. It is adequately illustrated and contains tables of dimensions, ratings, etc.

Kohler Electric Plants.—Kohler Co. has recently published a new general folder illustrating and describing a number of the most popular of its line of 73 models, emphasizing the wide range of capacities for all jobs of all sizes. Copies will be mailed on request.

Geared Turbines That Have Made History.—Westinghouse Electric & Manufacturing Company has just issued a very attractive booklet, printed in colors and identified as Special Publication 1943. In it the records of a number of interesting geared turbine ships are given, and both the ships and the machinery are described and illustrated. A complete list of vessels equipped with Westinghouse geared turbine propelling machinery is included.

TRADE NOTE

Fast Freighters.—According to an announcement by Erik Krag, general Pacific Coast Manager for the Interocean Line, the first of three new motorships for service between Pacific Coast ports and ports of France, Belgium, and Holland was launched April 30 at Amsterdam. The three vessels will be named Berganger, Moldanger, and Trondanger and will have a service speed of 18 knots, giving 20 days service between California and Europe—the fastest in this trade. The first vessel is scheduled for completion in August and the other two in September and October.

The New Sperry Steering System

By R. W. Bigelow

THE Sperry Electro Mechanical Steering System was developed in order to meet the steering problem of intermediate-sized vessels. It combines all the advantages of follow-up electrical steering — speed and ease of control — with positive, mechanical control of the rudder whether the power is "On" or "Off." No intermediate step on the part of the wheelsman is necessary. When steering "electric" the rudder moves with a touch of the wheel. If the electrical power fails, the wheelsman simply continues steering with the same wheel and in the same manner as when the power was on, the only difference being that he now has to provide the power himself for moving the rudder. When the current to the system is restored, he likewise continues to steer with the same wheel and in the same manner, only his movement of the wheel now controls an electric motor which provides the power for moving the rudder as before.

The Sperry Electro-Mechanical Steering System is the first hand and electric steering equipment that combines the functions of a "follow-up" for normal steering with the self-energizing feature for maneuvering. The operating principles of the Sperry Electro-Mechanical Steering System are briefly as follows:

A conventional shaft steering-system is employed between the wheelhouse and the electric steering engine. Within the steering stand, a sturdy, mechanical control device is inserted in the shafting. This control device makes an electrical contact when the steering wheel is turned, starting the steering motor and moving the rudder. When the steering wheel is stopped, the steering engine turns the shafting between the engine room and the bridge to open the contact, thus stopping the steering engine. A dynamic braking arrangement and an electro-magnetic brake prevents the steering engine from over-running and also keeps it from turning when the steering wheel is stationary, thus holding the rudder in any desired position whether the vessel is going ahead or astern. If the electrical power should fail, the steering wheel is simply turned in the usual manner by hand. The



The pilot house end of the Sperry electro-mechanical steering gear.

wheel is in permanent agreement with the rudder (plus or minus the small lost-motion angle used for electrical control). Consequently, there is no interruption when the physical energy of the wheelsman is substituted for the electrical power of the steering engine for controlling the rudder. When the power fails, a magnetic clutch on the steering motor automatically disconnects the motor from the system so that the wheel is free to move the rudder directly, without the drag of the motor. When power



Control panel and steering motor mounted in the engine room of the John J. Harvey.

is restored, the clutch reconnects the motor automatically and the wheelsman continues his steering without interruption.

The follow-up control provided in this steering system never requires synchronizing, as the rudder, the steering wheel, and the rudder indicator are positively connected to one another. Damage to rudder and steering equipment that might be caused by heavy seas or by striking an obstruction is guarded against by the magnetic clutch which is set to slip when a predetermined load is exceeded. Thus it is possible to supply a steering engine of minimum weight and size and yet have complete protection against shock or overload.

The steering engine provided with this system is of the drum type, arranged for mounting in the engine room. Its construction permits it to be mounted in any desired position, the usual method being to suspend it from overhead in the engine room, thus saving valuable deck space and providing a fair lead for wire cable which passes over suitable sheaves to the rudder quadrant.

The electrical control used with the electro-mechanical steering system is the result of many years experience on the part of the Sperry Gyroscope Company with scores of installations of this type of equipment. This experience has led to an entirely new conception of the requirements for start and stop steering gear duty and has brought forward a new type of control which gives smooth acceleration and employs only six moving parts on the control panel.

The Sperry Electro Mechanical Steering System is adapted to vessels of any size up to the largest that can be steered manually in emergency — ranging from the smallest size requiring power steering, up to vessels of 250 or 300 feet in length. The system is supplied with steering engines of two, four, six, or eight horsepower, depending on the characteristics of the vessel to be equipped.

The electro mechanical steerer is already in service on several types of vessels, including fireboats, Coast Guard patrol vessels, tow-boats, and tenders.



American Shipbuilding

Edited by H. C. McKinnon

Work Started on Reconditioning of Freighters. Craig Shipbuilding Company, Long Beach, Calif., has started work of reconditioning the two freighters Point Ancha and Point Lobos of the Gulf Pacific Mail Line (Swayne & Hoyt, Ltd., San Francisco) contract for which was let recently and which will aggregate \$76,000.

One of these vessels will be equipped with a Westinghouse exhaust turbine and the other with a Bauer-Wach type exhaust turbine manufactured by the De Laval Steam Turbine Company. Orders for the machinery units were placed sometime ago.

In addition to improvements to the vessel's power plant, each vessel will be fitted with accommodations for eight passengers. These vessels are of 4800 tons gross and 2900 net weight, and 383 feet in length.

Seattle-Built Ship Has Trials. The motorboat Catalyst, built by the Lake Union Drydock & Machine Works, Seattle, for the University of Washington, Oceanographic Department, held her trial trip last month. The vessel was designed by Rowland and Strickland and cost \$44,150. She is 75 feet long, 19 feet beam, and is powered by a Washington 140-horsepower diesel engine. The boat was built from a fund of \$200,000 from the Rockefeller Foundation given to the University for the equipping of scientific laboratories for the study of Oceanography.

Convert Tug to Oil Burner. The Moore Dry Dock Co., Oakland, Calif., has been awarded contract for installing Ray oil burners on the boilers of the U.S.A. Transport Service tug Slocum, which has been operated for many years at the Transport Docks, San Francisco. Besides the installation of the oil burners, oil fuel bunker tanks must be installed, as the vessel has heretofore been a coal-burner. The cost of the work will be in the neighborhood of \$30,000.

Motorship Planned. It is reported from the Atlantic Coast that O. C. Chapman & Co., 119 South Fourth Street, Philadelphia, Pa., consulting engineers and naval architects, have prepared plans for the construction of a 175-foot, diesel-powered freight and passenger vessel for the B. C. & O. Line, of Baltimore.

This firm of engineers and architects is said to be busy also on several conversion jobs involving the installation of diesel engine power plants in existing vessels.

Dredge for Mississippi. Chief of Engineers, War Department, Washington, D.C., has plans under way for the construction of a new type shallow draft suction dredge for operation in the waters of the upper Mississippi.

Bids Submitted on Lighthouse Tenders. Bids were opened July 7 by the Commissioner of Lighthouses, Department of Commerce, Washington, D.C., for the construction of two lighthouse tenders.

These vessels are to be known as the Arbutus and Wisteria. The former will be 174 ft. 6½ in. long, 32 ft. molded beam, 14 ft. 6 in. depth. She will have twin screws and will be powered by two triple-expansion steam engines developing 1000 horsepower at 150 revolutions per minute.

The Wisteria will have diesel-electric power plant and will be 116 ft. long.

Prince David Repairs. Halifax Shipyards, Ltd., Halifax, Nova Scotia, received the contract for repairs to the Canadian National Steamship's steamer Prince David, which stranded last winter on a coral reef near Bermuda and was badly damaged. The low bid of the Halifax shipyard was \$422,500.

Bids were submitted by yards in Canada, United States, England, Scotland, and Ireland.

Tenders Asked on Tanker. According to reports from the Atlantic Coast, several shipyards have been asked to submit tentative plans and

specifications with estimates for the construction of a 3000-horsepower, 13,000-ton cargo oil tanker for the Gulf Refining Company, 17 Battery Place, New York.

Recondition Lightship.—Bids will be opened at the office of the Superintendent of Lighthouses, Eighth District, Customs House, San Francisco, on July 28 for betterments to the Lightship Relief, No. 76. Shipyards are asked to bid on the work, which will consist principally in the conversion of the ship from coal to oil burning, with the installation of one or two new boilers. Other minor improvements may be needed to bring the vessel up to the efficiency specified by the Lighthouse Service.

Lurline Launched.—Last of the three liners building for the Oceanic Line (Matson Navigation Company) of San Francisco by the Bethlehem Shipbuilding Corp., Ltd., the Steamship Lurline was launched on July 18 at the Fore River Plant. Mrs. W. P. Roth, wife of the president of the Matson Navigation Company, was the sponsor for the ship's christening. Before her marriage, Mrs. Roth was Lurline Matson, daughter of the late William Matson, founder of the Matson Navigation Company, having been named for one of her father's early sailing ships.

When the Steamship Lurline enters service on the Pacific, she will be the third of this name to be operated by the Matson interests. The first was the brigantine Lurline, built to Captain Matson's order in 1887; the second was the steamer Lurline built in 1908, boasting a freight capacity of nearly 8000 tons and passenger accommodations for about 20 persons.

The latest Lurline, like her sister ships Mariposa and Monterey, has a length over all of 632 feet, breadth of 79 feet, and gross tonnage of 22,000. The passenger accommodations provide for 700 in first and tourist cabins. The vessel is propelled by three steam turbines developing 22,000 shaft horsepower.

er, steam being supplied by 12 Babcock & Wilcox boilers. The vessel is designed for a sea speed of 20½ knots. Delivery is scheduled for early in 1933.

Sailing Ship Cruises. — Two of the square riggers of the sailing fleet of the Alaska Packers Association are being taken out of their moorings and will again sail the seas, but not in the carrying of cargoes. The old *Star of England* was recently purchased by Edward Elson Grieve of Los Angeles and is hauled out on the marine ways of the General Engineering & Drydock Co., Oakland, for overhaul, painting, and survey. It is the intention of the purchaser, according to statement made by Mr. Grieve at Los Angeles, to sail with a party of friends, scientists, artists, or anyone having the wherewithal to pay for his own grub, and the ports of call will be left to whims of the moment. The ship will probably sail with only the general plan of making a trip around the world.

According to well grounded reports, the ship *Star of Alaska* has been chartered from the Alaska Packers Association by an organization in Spruce Pine, North Carolina, and will make a Windjammer World Cruise, sailing westward from the Golden Gate. S. T. Henry of Spruce Pine and Anthony Anabel of New York are said to be the active leaders in the chartering deal and it is reported that the cruise will be made up of young men, recent college graduates, who will man the ship with the assistance of a skeleton crew of experienced sailing ship mariners. The vessel must undergo some reconditioning, and additional accommodation must be added. She will sail in ballast.

Overhaul Fleet at Esquimalt. — The Canadian Pacific Steamships, Ltd., has decided to carry on mid-summer overhaul of its transpacific fleet at the Yarrow drydock at Esquimalt, British Columbia, instead of in the Orient. The vessels to go on dry-dock are the *Empress of Russia*, *Empress of Japan*, *Empress of Canada*, and *Empress of Asia*. Captain Edmund Aiken is general superintendent of the line.

Converts Freighter. — Commercial Boiler Works, Seattle, Wash., is engaged in converting the motor freighter *Aleutian Native* to an oil-carrying vessel for operation on Puget Sound. The plans and specifications for the work of fitting

this vessel for its new service were prepared by H. C. Hanson, Seattle naval architect, who is supervising the work.

The *Aleutian Native* was built by the Kanaga Ranching Company for Alaska service. She is 125 ft. long, 25 ft. beam, and 13 ft. depth; and is powered by a 200-horsepower diesel engine. She has been purchased by the Petroleum Navigation Company of Seattle for operation from Seattle to Bellingham, Olympia, Port Angeles, and Vancouver, B.C.

Ten oil tanks are to be built into the cargo hull of the vessel, with expansion domes installed where necessary. Pump and motor room is being built forward. A CO2 fire extinguishing system is being installed, as well as two Fairbanks-Morse motor-driven pumps. Yukon oil burners are being fitted to the galley range. The vessel, when completed, will have a cargo capacity for 8500 gallons of oil and gasoline and the work will cost about \$10,000.

Memorial services for William H. Todd, late president of the Todd Shipyards Corporation, were held at Kismet Temple, Brooklyn, on July 21.

Addresses were made by Hon. T. V. O'Connor, chairman, United States Shipping Board; Hon. John MacCrater, Supreme Court Justice; H. Gerriah Smith, president of the National Council of American Shipbuilders; Ira A. Campbell, secretary of the American Steamship Owners Association; and Hon. Alfred E. Smith. Former Senator William M. Calder presided.

The invocation was delivered and the benediction pronounced by the Reverend Doctor Charles William Roeder, pastor of the Flatlands Dutch Reform Church and Chaplain of the 13th Regiment. Henry G. Eskuche was the organist and vocal selections were given by the Double Quartettes of the New York Fire Department and the New York Police Department.

Kismet Temple was chosen because of Mr. Todd's masonic affiliations—he was a 32nd degree mason, both New York and Scottish rite and a life member of Kismet Temple—and because so many of his friends, associates, and employees expressed their wish to attend.

Ask Moratorium on Shipping Loans. The United States Shipping



John D. Reilly, who has been appointed president of the Todd Shipyards, succeeding the late William H. Todd.

Board is seeking the assistance of President Hoover and has also asked for an opinion from Attorney General Mitchell on the question of extending the time on loans granted to various shipping companies under the terms of the Merchant Marine Act of 1928. Chairman of the Shipping Board, T. V. O'Connor, has conferred with the President, but no reply has as yet been made public as to this proposal.

Burned Liner Being Reconditioned. Under the name of *Peten*, the former *United Fruit Company* liner *Segovia*, which was burned at the outfitting pier of Newport News Shipbuilding & Drydock Company while nearing completion last year is being reconditioned and will be ready for service early next year.

Contract Placed for Dredge Conversion. — Maryland Dry Dock Co., Inc., Baltimore, Maryland, has been awarded contract by the U. S. Engineers Office, Norfolk, Va., for the conversion of the steamship *Detroit Wayne* to a 20 inch seagoing agitator dredge. The yard submitted a low bid of \$144,230 and 55 days.

WINGS FOR BOATS

Speed of power boats up to 50 feet long can be almost doubled with no increase on power by attaching two narrow planes to the hull, according to Dr. Oskar G. Tietjens, Westinghouse research engineer. These planes, shaped like an airplane's wings, will lift the boat entirely out of the water, thus eliminating much friction resistance of the water, says the scientist.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of July 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W. Seattle, Wn.
Not named, wooden hull, stern-wheel, river steamer for Alaska Railroad, Dept. of Interior, Bell St. Terminal, Seattle, Wn.; 235 L.O.A.; 210 L.B.P.; 6 ft. depth: 3'6" draft; 2 tan. comp. steam engs.; wood-burning boilers; 100 pass.; 300 tons freight.

U. S. NAVY YARD, Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 10/2/32 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD, San Francisco, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31; deliver 2/11/34 est.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: tug Sea Prince, stmr. Astoria, m.s. Lio, stmr. Peter Helms, stmr. Cathwood, tug Sea Witch, stmr. D. G. Scofield, stmr. Maunganui, stmr. Talamanca, State Dredge No. 3, tug Gov. Irwin, stmr. Virginia, stmr. Antigua, stmr. W. S. Miller, Astoria Oil Barge 1922, stmr. Pres. Jackson, stmr. Admiral Senn, stmr. schr. Chehalis, U. S. Dredge San Pablo, stmr. F. H. Hillman, Straighten and refit anchor shackle pin; stmr. Cuzco, Brazo copper pipes; stmr. Cricket. Make and install copper gland on lubricating oil pipe; m.v. Aramis. Caulk rivets; stmr. Santa Maria. Renew 2 bent sections of 4-inch iron pipes; m.s. Finnanger. Repairs to Dahl fuel oil heaters; stmr. Edwin Christenson. Misc. repairs: stmr. Nora, whaler Barbara, stmr. Utacarbon, stmr. Antigua, stmr. Maunganui, stmr. Point Salinas, stmr. Point Chico, stmr. Chirigui, stmr. Georgian.

THE MOORE DRY DOCK COMPANY, Oakland, Calif.

Miscellaneous repairs and dry-docking: Samoa, Cadaretta, Willkeno, Golden Coast, Santa Cecilia, Janidore, Tiverton, Texan, West Cactus, California, U.S.C.G. cutter Golden Gate, Golden Sun, Western Pacific Barge No. 1, Santa Ana, Lansing, ferry Golden Age, Chas. R. McCormick, Willamette, Nebraska, Barge No. 1923.

CRAIG SHIPBUILDING COMPANY, Long Beach, Calif.

Reconditioning and installation of exhaust turbines: Wayne & Hoyt stms. Point Ancha and Point Lobos.

COLLINGWOOD SHIPYARDS, LTD., Collingwood, Ontario

General repairs to hull: dredge Sydenham.

GENERAL ENGINEERING & DRYDOCK CO.

Machinery repairs: Silverhazel. Repairs and reconstruction: Western Pacific carfloat No. 1. Drydock and general repairs: stmr. Petaluma.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Docked, cleaned, painted, minor hull repairs: C.N.R. barge C.N. 105. Docked, cleaned, painted, misc. hull and engine repairs: 8 fishing boats. Misc. hull and engine repairs not requiring docking: 15 fishing boats.

U. S. NAVY YARD, Bremerton, Wn.

Repairs and docking: Lexington, Saratoga, Colorado, Neches, Claxton, Elliot, Yarnall. Misc. repairs: Eagle 57. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY, Pittsburgh, Pa.

Purchasing Agent: W. G. A. Millar.
12 barges for American Barge Line Co., Louisville, Ky.; 158 x 35 x 11 ft.; 182 net tons steel each; delivery July and August.

BATH IRON WORKS Bath, Maine

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed; deliver 6/11/34 est.

Not named, hull 155, quarantine tug for U. S. Public Health Service, Boston; 60 ft. long; 15 ft. beam; 7 ft. depth.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington, D.C.; 131 long; 24'6" molded beam; 8'6" molded draft; 500 H.P. eng.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT, Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement; deliver 8/15/32 est.

Lurline, hull 1447, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launch 7/18/32 est.; deliver Jan./33 est.

Quirigua, hull 1445, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 2/6/32; delivered.

Veragua, hull 1446, sister to above; launched 4/23/32.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed; deliver 2/11/34 est.

CHARLESTON DRY DOCK & MACHINERY CO., Charleston, S.C.

All welded river towboat for Pure Oil Co. of Chicago, Ill., to be used on Savannah River.

DEFOE BOAT & MOTOR WORKS Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.
Escanaba, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W-T boilers; keel 12/15/31; launch 7/20/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY, Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6".

Hull 1139, steel hull, 20-in. pipe-line, self-propelled, diesel-electric powered dredge for U. S. Engineers Office, St. Louis, Mo. Hull 1140, same as above.

Hull 1141, steel hull derrick scow for Atlantic, Gulf & Pacific Co.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

ELECTRIC BOAT CO., Groton, Conn.

Cuttlefish, fleet submarine SS171 for U. S. Navy; keel 10/7/31; deliver 12/29/33 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32.

Santa Paula, hull 122, sister to above; keel 8/4/31; launched 6/11/32.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31.

Santa Elena, hull 124, sister to above; keel 3/24/32.

GREAT LAKES ENGINEERING WORKS

River Rouge, Michigan

Not named, hull 280, diesel-electric tug for Ford Motor Co., Detroit; 75 L.B.P.; 2 beam; 12 loaded draft; 500 S.H.P.; keel 5/9/32; launched 6/14/32; delivery 7/15/32 est.

HOWARD SHIPYARDS & DOCK COMPANY,

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.
Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas

Car. No. 138 by 30 by 5 ft.; keel 3/21/32; launched 5/31/32; deliver 8/32 est.

MARIETTA MANUFACTURING CO., Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.
Captain William Clark, dredge, for U. S. Engineers Office, Washington, D.C.; 28 x 50 x 8'6"; launched delivered 6/1/32.

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.; 132 x 35 x 10 ft.; 5 delivered; deliver balance 6/1/32 est.

MIDLAND BARGE COMPANY, Midland, Penn.

Eight floating steel caissons for Foundation Co. 6 delivered.

One 15-ton derrick boat for U. S. Engineers Office, Huntington, W. Va.
H. K. Berry Finn, tunnel stern, stern-wheel, diesel-powered towboat for Inland Waterways Corp., Washington, D.C.; 160 ft. by 50 by 8 ft. depth, two 590 B.H.P. McAlister & Seymour diesel engs.
Tom Sawyer, same as above.

NASHVILLE BRIDGE COMPANY, Nashville, Tenn.

Purchasing Agent: R. L. Baldwin.
Not named, hull 265, gas launch for U. S. Engineers, Pittsburgh 40 x 8 x 8 ft.; keel 4/27/32; launched 6/10/32.

Hull 766, 31 ft. workboat for U. S. Engineers, Nashville, keel 6/1/32; launch 7/10/32 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Colombia, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York: 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 1/29/32; launch 8/32 est.; deliver 12/1/32 est.

Haiti, hull 348, sister to above; keel 4/4/32; launch 9/32 est.; deliver 12/15/32 est.

Acadia, hull 351, comb. passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 8/31/31; launched 2/13/32; delivered 6/7/32.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver 5/1/34 est.

Peten, hull 354, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17 1/2 knots speed; 10,940 tons displacement; turbo-electric propulsion, 10,500 I.H.P.; keel 3/9/31; launched 8/15/31; Reconditioning; deliver 2/26/33 est.

NEW YORK SHIPBUILDING CO., Camden, N. J.

Purchasing Agent: J. W. Meeker.
Indianapolis, hull 359, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31; deliver 10/15/32 est.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launched 12/5/31; deliver 8/1/32 est.

Washington, hull 406, passenger and car-

go vessel, same as above, keel 1/20/31; launch 8/20/32 est.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C. 578 L.B.P.; 60'11 1/2" molded beam, 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31; deliver 3/3/34 est.

Reconditioning—Four vessels for American Seacraft Lines, 390 by 54 by 32 ft. all completed, 7/2/32.

SPEDDEN SHIPBUILDING CO., Baltimore, Maryland

Purchasing Agent: W. J. Collison

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.; 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng.; keel 3/15/32; launch 8/1/32 est.; deliver 10/31/32 est.

Not named, hull 273, diesel tug for U. S. Public Health Service, New Orleans, La.; 71 L.B.P.; 16'11" beam; 8' depth; 210 B.H.P. Fairbanks-Morse diesel eng.; completion 250 days; keel 7/11/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY, Chester, Penn.

Purchasing Agent: H. W. Scott.

Seatrunk New York hull 146 single-screw steamship for carrying loaded railway cars for Seatrunk Lines, Inc., New York and New Orleans 464'6" by 63'6" by 38'3"; 15 1/2 knots speed; 8500 D.W.T.; keel 2/24/32; launch 8/27/32 est.; deliver 9/32 est.

Seatrunk Havana, hull 147, sister to above; keel 2/24/32; launch 9/3/32 est.; deliver 9/32 est.

U. S. NAVY YARD, Boston, Mass.

MacDonough, U. S. Torpedo Boat Destroyer DD 351 for U. S. Navy; 340 ft. long; 35 knots speed; complete 8/11/34 est.

U. S. NAVY YARD New York.

New Orleans, light cruiser CA32, for U. S. Navy; 10,000 tons displacement; deliver 6/2/33 est.

Not named, U. S. Torpedo Boat Destroyer (DD 350) for U. S. Navy; 340 ft. long; 35 knots speed; complete 6/11/34 est.

U. S. NAVY YARD Philadelphia, Pa.

Minneapolis, light cruiser CA36 for U. S. Navy; 10,000 tons displacement; deliver 10/2/33 est.

U. S. NAVY YARD Portsmouth, Va.

Dolphin, fleet submarine SS169 for U. S. Navy; commissioned 6/1/32.

Cachalot, fleet submarine SS170 for U. S. Navy; deliver 9/16/33 est.

FREIGHTS, CHARTERS, SALES

July 18, 1932

AKOKUSAI steamer has been fixed with grain from San Francisco to U. K., 23rd, August, by Strauss & Co.

The following steamers have been fixed with lumber to Australia: Japanese motorship Sunten Maru, British Columbia to one port Australia, July; two Kawasaki vessels, British Columbia to Australia, July.

The following time charters have been reported: British motorship

King James, 1 trip, delivery British Columbia, redelivery U. K. Cont., Bordeaux Hamburg range, 5/9, August, Canadian Transport Co.; British motorship Aldington Court, 1 trip, delivery North Pacific, redelivery U.K. Cont., Bordeaux Hamburg range, 6th, July, W. L. Conyn & Sons; British motorship Spring bank, one trip, delivery British Columbia, redelivery U.K. Cont., Bordeaux Hamburg range, 5/9, July, Canadian Transport Co.; British motorship Vinemoor, one trip, delivery British Columbia, redelivery U.K. Cont., Bordeaux Hamburg range, \$1.10, July, Canadian Transport Co.

The following sales have been reported: American tank steamer Lansing, California Sea Products to Fishermans Produce Co.; U. S. lightship Umatilla No. 67, U. S. Government to Pacific Metal & Salvage Co., Seattle; (Seattle) steamers Pacific Hemlock, \$15,000, Pacific Pine, \$10,000, Pacific Spruce, \$10,000, U. S. Marshall to U. S. Shipping Board; American barkentine Star of England, Alaska Packers to Edward E. Grieve of Los Angeles.

PAGE BROS., Brokers

Mexico's Marine Program.—The national marine construction program of Mexico for 1932 involves appropriations aggregating \$572,000, according to a report from Vice-Consul Thos. J. Maleady, Mexico City, and includes the work on the following projects which were begun in 1931:

Dredging in Panuco river (State of Tamaulipas), Coatzacoalcas River (Vera Cruz), harbor of Frontera (Tabasco), and Tampico-Tuxpan canal (Tamaulipas); termination of Vera Cruz harbor dredging; construction of a wharf at Ciudad del Carmen (Campeche); introduction of potable water in Acapulco (Guerrero), and termination of the southeast breakwater at Mazatlan, Sinaloa.

New projects scheduled to be undertaken during 1932 are reported as: Study and preliminary work in connection with construction of a harbor at Punta Piedra, Sonora; general conservation of harbors on both coasts; general repairs to fiscal wharfs at Tampico and La Paz, Lower California. Also, lighthouse construction at Punta Molas (Cozumel Island), Cabo Tosco (Lower California), and general conservation of lighthouses on both coasts.



Marine Insurance

Rates and Modern Improvements

*The Bearing of Recent Developments in Marine Machinery and Equipment
on Marine Insurance Rate Structures*

By R. J. Alexander

(Written Expressly for Pacific Marine Review)

THE peculiarities of the rate structure built up during the past two hundred years by the marine insurance experts of the maritime world have been the cause of many complaints and much criticism, particularly in recent years and in America where so many citizens have entered the ship operating field with no previous marine experience. To such an operator it seems very peculiar that the installation of, for instance, a Fathometer or a Gyro-helmsman, or an improved fire detection or extinguishing device on one of his ships does not promptly entitle that ship to a reduced rate. He knows that the installation of fire hydrants close to his home or office, the installation of improved sprinkling systems in his warehouse, or any one of a number of improvements has an almost immediate effect on his fire insurance rate ashore.

The cases, however, are by no means parallel. Ashore the peril of fire alone is involved in the policy risk. The spread is so broad and the exposure so definitely measurable that the rate is based almost solely on physical conditions of the structure and its surroundings. Fire protection equipment is subject to immediate or periodic survey by the experts of the underwriting companies. In fact, all conditions surrounding the insured risk and its owner are more or less under control by the underwriter or his agent.

At sea, conditions have been, and, in most cases, still are entirely different. The ship on long voyages in the good old days of sail was for long periods of time not only out of the range of any possible inspection by underwriters, but also entirely out of any control or

supervision by her owners. For this reason, marine insurance rate structures have been built up almost wholly around the experience of the underwriting companies with the operator and the master mariners who have charge of that operator's ships. Some underwriters, both in America and in Europe, in recent years have had considerable financial grief by neglecting the lessons of experience in dealing with marine insurance rates.

To-day there is some justification for the belief that it is becoming rapidly more possible to change somewhat the old basis for marine insurance rates. To-day no overseas vessel of any importance need be out of the control of her owners at any time. Wireless communication has become so reliable and so widespread that an owner, sitting in his San Francisco office, can transmit orders to a captain on any vessel of his fleet at any location on any ocean. To-day cargo liner, combination liner, and passenger liner services carry the bulk of the world's sea trade, and these vessels are all equipped with powerful wireless and radio sets; so that they are constantly subject to shore control. This has, in some instances, worked apparently to the detriment of discipline and seemingly to the endangering and even the loss of ships, crew, and passengers. However, it should work in exactly the opposite direction, and the remarkable records of safety at sea shown by the merchant marine fleets in recent years are proof enough that it does so work.

Now the point of all this rambling comment is simply this: A safety device, no matter how efficient it may

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ing, depends on the human element for its reliable functioning. This is true even of automatic devices. Unless they are kept in good condition by the intelligent care of an attendant they do not function in an emergency. Many old shipmasters have a tendency to ignore or scorn the modern safety gadgets that have been installed on their vessels. Some such will grudgingly use a radio compass or a Fathometer during fog conditions and will refuse to believe what these instruments tell them unless the instruments agree with the "dead reckoning." There are such masters, many of whom have perfect records and are very valuable agents and servants of their employers. Such men are easily discernible among the personnel of any one company, and it would seem that through the medium of wireless such men could be educated in the use of safety gadgets by occasionally calling for reports or Fathometer soundings, radio bearings, and other records.

Any safety device installed on a deepsea vessel should be tested and used daily by those members of the crew whose duty it is to attend to that device in an emergency, and detailed reports of such tests and use should appear in the ship's log.

Operating firms who will follow this practice and keep at it over an extended series of voyages will soon find:

(1) That the morale of the operating crews will be greatly improved;

(2) That consumption of fuel and of engine room, steward, and deck stores will be reduced.

(3) That their marine insurance rates will be gradually reduced as their experience shows improvement in the underwriter's records.

A little cooperation between owners and operators along these lines should result in much more satisfactory experience to both parties.

So much for the owner's side of the question; now look at the matter from the underwriter's viewpoint. Does his recent marine experience warrant lowering rates?

Fire at sea, notwithstanding the recent improvements in fire detection and fire extinguishing appliances, has become a steadily increasing menace, particularly in passenger and combination liner class. Prior to the late war, marine fire losses constituted about 5 per cent. of the total; during the past ten years they have risen to 10 per cent. of the total. This phase of the maritime risk has been forcibly brought to the attention of underwriters, owners, and naval architects through the total destruction by fire of the French liner *Georges Philippar* on the Gulf of Aden on her maiden voyage, with large loss of life, both crew and passengers. The final report as to the causes of this fire has not been made

public, but expert comment in the press and in trade journals points out:

(a) That the super-luxury fittings of modern liners (wood, veneer over steel, large staff sculptures, and carved moldings, fluffy draperies, rugs, and carpets, light downy quilts covered with flimsy silk, and many other furnishings and fittings that are as tinder to a fire) are increasing the fire risk is beyond question.

(b) That the most recent London Conference on Safety of Life at Sea indicated a number of precautions which might be applied but which have been hitherto largely ignored. These precautions have to do mainly with the subdivision of the passenger quarters or tween deck spaces against the spread of fire and in the use, so far as practicable, of fire resistant or fire proof materials.

Although American styles in interior decoration have been trending in the direction of simplicity, still the fire in the *Leviathan* and more recently the practical destruction by fire of the passenger accommodations on the *Segovia*, a new vessel not yet delivered and one which was built to the most stringent regulations for safety, illustrate the necessity for further study to guard against the "Red Demon." Such study is going forward constantly in the laboratories of the underwriters, in the shipyards, and on the ships, and improvements are being suggested almost daily. It is only on long practical experience on shipboard on the ocean routes that underwriters can judge the effect of any device or method on underwriting cost, and underwriting cost is the final criterion upon which rates are based.

Cargo rates are likewise based on experience of underwriting cost with the ship operator. Damage to cargo may occur in many ways without damage to the ship, and ship operators are sometimes a little slow in assuming responsibility, intelligent care of the cargoes they carry. The installation of all the most approved devices and methods in connection with the stowage and the breaking out of general cargo avail nothing unless the personnel of the stevedoring gang and or the ship's crew are trained in the use of these devices and methods and are required to use care and diligence in that use.

On liner and on freighter, conditions are constantly improving and the record for safety of life, of ship, and of cargo at sea is slowly improving. If, however, the records of every operator were equal to those of the best operator, there would be a tremendous reduction in damage to cargo, in loss of hulls, in breakdown of machinery, and in loss of life,—and certainly a reduction in insurance rates and an increase in operating profits.

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Diesel Engine Operation

I. Duties of the Engineer

By H. A. Shawk

Chief Lubricating Engineer, Associated Oil Company

ALL seagoing engineers know that it is customary for the engineer who is about to take charge of a watch to always come on duty from fifteen to thirty minutes before time in order to observe operation of main engine and auxiliaries, check over running temperature, read the log, and talk to the watch engineer he is to relieve. When a watch is relieved at sea the incoming officer takes full charge and is responsible; therefore it is important to ascertain all operating conditions.

On stationary installations, if the machinery is operated on a twenty-four hour basis and engineers stand watch and watch, the same rules will hold good, but where the engines are started from a cold start, the engineer must give himself ample time to cope with any emergency which may come up. Sufficient time must be allotted for careful inspection of working parts and to check over lubricating and fuel systems before engines are started. The engine should have time to warm up on idle load before being subjected to full power load. A careful and responsible engineer will warm up slowly.

Upon assuming charge of a new job the engineer must familiarize

himself with instructions issued by the manufacturer and carefully trace out all lubrication, fuel, and cooling system lines. He will measure the oil in the reserve lubricating tanks, check on the appearance of oil in the system, and, in general, endeavor to master all mechanical details.

Before starting up a new job, the engineer in charge should make a personal inspection of all holding down bolts, cylinder head bolts, connecting rod bolts, and other fastenings. The crank case should be personally inspected for rags, dirt, loose tools, and other objects. Nothing should be left to chance or to inspection by subordinates who have no professional standing at stake. If possible, the engineer should blow down all lubricating lines during installation and inspect the lubricating sump tanks before supply is taken on. All screens, filters, and other devices in the lubrication system should be inspected and all gauges should be calibrated with a standard gauge of known accuracy to avoid a lubrication failure.

After starting up, an inspection for oil leaks should be made at all joints, connections, and fittings. No effort should be made in starting up new jobs to make a showing in economy on lubricating oil. Core, sand, rust, chips, lint, dirt, and grit of all kinds will always be found in any new oil system. A short run of an hour or so will be a good indication of any radical troubles, or "bugs" as they are known among designing engineers.

Lubricating oil has a tendency to foam on new jobs. This is caused by the presence of white lead, shellac, kerosene, oakite, lard oil, litharge, and other chemicals and compounds used in making up joints, pipe threading, etc.; and it is therefore something to expect and not-

ing to worry over

The performance of lubricating oil in diesel engine operation will be taken up in its proper sequence later on.

All manufacturers of diesel engines send an erecting engineer to install the unit and to stand by for a period of time to insure its acceptance and to act in an advisory capacity to the operating personnel. These men are, as a general rule, high class engineers well versed in the care and operation of their machinery, and much valuable information can be obtained by carefully following their ideas. Service engineers follow along from time to time to render service and give advice. In every way the manufacturer tries to see that the customer is receiving highest value.

All diesel engine builders provide a set of blue-prints and an operating manual which the engineer will do well to study constantly in order to become thoroughly familiar with every part of the engine and auxiliaries. Each line should be traced out, all valves, cross-overs, and emergency measures should be memorized. There is nothing so embarrassing to an engineer as to be helpless in an emergency. Such an unfortunate occurrence is a direct reflection on ability.

The appearance of the engine room is an index to ability and to the engineer's interest in his work. Likewise, the engineer should be careful of his personal appearance. An engine room log should always be maintained in which temperature and pressure readings at regular intervals should be recorded. All repairs made should be described in detail with micrometer readings carefully set down for future reference. Log books are kept on all motorships and in most diesel engine plants, but in small installations the practice is not general.

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Trade Notes

Important Representation Appointment. — Foster Wheeler Corporation has appointed Consolidated Steel Corporation, Ltd., exclusive sales and manufacturing representatives for Foster Wheeler products on the Pacific Coast, including the states of California, Washington, Oregon, Nevada, Utah, Arizona, and New Mexico. Consolidated Steel will handle the entire line of Foster Wheeler equipment, including power plant, marine, oil refinery, and gasoline plant apparatus.

Foster Wheeler sales were previously handled by district offices in San Francisco and Los Angeles under the direction of C. L. Froding of San Francisco. Mr. Froding was assisted by R. D. Spear in San Francisco and M. J. Gavin in Los Angeles. Messrs. Froding and Spear are now located in the San Francisco office of Consolidated Steel and Mr. Gavin is in the main office of Consolidated Steel in Los Angeles.

Foster Wheeler will continue to maintain a complete engineering organization in Los Angeles under the direction of W. L. Rifenberick, chief engineer of the Gasoline Department in California. This engineering department will remain in its former offices in the Petroleum Securities Building.

In addition to handling the sales of Foster Wheeler equipment, Consolidated Steel will manufacture the major portion of such equipment installed in the Pacific Coast territory. Consolidated Steel Corporation, Ltd., has one of the most modern machine shops in the country.

New Type Radio. The Mackay Radio and Telegraph Company has installed a new type of short wave radio transmitting and receiving equipment on the liners Scapenn and Scanyork of the American Scantic Line. These vessels were recently restored to transatlantic service after a thorough reconditioning at the plant of the New York Shipbuilding Company. The new equipment consists of a short wave radio-telegraph transmitter with a frequency range of 5500 to 17,000 kilocycles. The vessels are thereby enabled to keep in touch with the shore stations of the Mackay Radio during the entire voyage from New York to Baltic ports.

New Name.—International Paint

Company, Inc., is the new corporate name adopted by the well known manufacturer of paints and compositions, the former International Compositions Company, Inc. The new name, according to an announcement by the company, not only conforms with the names of its associated companies, but better describes the products which it manufactures.

New Quarters. Lalor Electric & Engineering Company, Ltd., is now located in new and convenient quarters at 67 Steuart Street, San Francisco, the change affording closer location to the Embarcadero and operating offices of shipping lines.

Lalor Electric & Engineering Company, Jerome Lalor, president, represents the following well known marine equipment manufacturers: Chas. J. Henschel & Co., Inc.; Alexander McNab; Airplane & Marine Direction Finder Corporation; Lenox Company, Inc.; Nils F. Nord; and the Atlantic Metal Hose Co., Inc.

Gyro-Compass School. Announcement is made by the Sperry Gyroscopic Company, Inc. that its school in Brooklyn for instruction in the care and operation of Gyro-Compasses, Gyro-Pilots, and other navigational equipment of its manufacture will be closed for a period of two weeks beginning August 1. The school will be open again on August 15.

Refrigeration Appointment. Geo. Swett, of Western Engineering Co. of San Francisco, announces that Matt C. Dillingham, formerly of the Carrier Engineering Corporation staff, is now with Western Engineering Company in charge of industrial and commercial refrigeration and air conditioning sales. Dillingham is widely experienced in his line and is widely known in the industry.

Trade Literature

Turbine-Electric Drive. The General Electric Company has just released a notable trade publication. It treats in a masterly way the subject of the electric drive ship—and

follows the development of this important prime mover from the first installation in the Chicago fireboats Graeme Stewart and Joseph Medill in 1908 to the fine examples of modern seagoing hotel service represented in such vessels as the California, Virginia, and Pennsylvania of the Panama-Pacific Line, the President Hoover and President Coolidge of the Dollar Line, the new United Fruit fleet, including Talamanca and Chiriqui, the Santa Clara of the Grace Line, such popular foreign vessels as the Viceroy of India, the Strathnaver and Strathaird, and the Rangatira of the Union Steamship Company.

The booklet contains 60 pages, is printed on fine coated stock, and is illustrated with many fine pictures of turbo-electric vessels. Details of the construction, installation, and operation of this type of drive for modern seagoing commercial and naval vessels are covered with unusual thoroughness. Copies are obtainable on request.

Ports of Astoria (Oregon), Longview and Vancouver (Washington) are described in a Port Series publication issued jointly by the War Department Board of Engineers for Rivers and Harbors and the United States Shipping Board. The booklet contains 160 pages with tabular data, maps, photographs, and charts. The wide scope of the study and the variety of subjects treated make the book of special value to steamship owners and operators, shippers, importers, and exporters and others seeking authentic data in convenient form on these three Columbia River ports.

Temperature Measurements in Generators, Transformers, and Cable Systems is the title of a revised edition of Bulletin No. 871 issued by Leeds & Northrup Company, Philadelphia, Pa. This catalog is well illustrated with pictures, charts, and graphs, and contains price-lists of the products.

The Cameron Motorpump. Ingersoll-Rand Company, Phillipsburg, N.J., has just issued a new folder briefly describing its line of merchandising Motorpumps in sizes from ½ to 25 horsepower, good for 5 to 800 gallons per minute. The Motorpump is a complete pumping unit with built-in electric motor. Copies of the booklet are obtainable on request.

Pacific Marine Personals

"NAMES ARE NEWS" ~ BY PAUL FAULKNER

Master Named for Santa Rosa. According to an announcement by C. C. Mallory, vice-president and general manager of the Grace Line-Panama Mail Service, Captain Curt Zastrow is to be master of the new combination steamship Santa Rosa, which is now nearing completion at the plant of the Federal Shipbuilding & Dry-Dock Company.

Captain Zastrow has been in the service of the Panama Mail Steamship Company and its predecessor, the Pacific Mail Steamship Company since 1907. He was born May 11, 1887, and before joining the old Pacific Mail Steamship Company as quartermaster, Zastrow served for several years aboard sailing vessels. Under the Pacific Mail flag he commanded the San Jose, San Juan, City of Para, Corinto, City of San Francisco, and Ecuador.



To introduce the fine new steam turbine powered, combination passenger and cargo liner Santa Rosa to the various foreign and domestic ports served by the Panama Mail Service of the Grace Lines, the company has chosen Captain Curt Zastrow—popular and capable—as skipper.

Paves Way for Liner. Roy V. Crowder, passenger traffic manager of the Grace Lines arrived on the Pacific Coast last month from New York to confer with C. C. Mallory vice-president and general manager, and W. A. Young, Jr., general passenger traffic manager, and other officials of the Grace Lines-Panama Mail Service in preparation for the advent of the four new \$5,000,000 express passenger and freight liners now nearing completion for the Panama Mail Service. These vessels are now building at the Newark plant of the Federal Shipbuilding & Dry Dock Company. They are scheduled for operation in the regular service of the Panama Mail Steamship Company between California ports and New York, via Mexico, Central and South America, and Havana, via the Panama Canal.

The first of the four liners, the Santa Rosa, is scheduled to sail from New York on November 26 for her maiden voyage to San Francisco. The other three vessels, the Santa Paula, Santa Lucia, and Santa Elena will follow, sailing dates being tentatively set for January 7, February 18, and April 1, respectively.

Crowder is widely known on the Pacific Coast, having served for eight years as general passenger traffic manager for the Los Ange-

les Steamship Company with headquarters in San Francisco, and prior to that being associated with the old Toyo Kisen Kaisha. He joined the Grace Line a year ago, making his headquarters at New York.

Golf Tournament. The boys are practicing up for the Fourth Annual San Francisco Steamship Golf Tournament which is planned for the day before this book goes to press—July 22—at the California

Golf Club, Baden. W. J. Edwards, of the firm of Norton, Lilly & Co., is general chairman, while Roger Lapham has again been elected honorary chairman. Committee members are: Membership, W. C. Empey, chairman; Hugh Gallagher, Ralph W. Bybee, Course; Harvey M. Huff, chairman; Thomas Crowley, Frank Fox, Entertainment; Leo E. Archer, chairman; Ralph G. Sullivan, C. C. Mallory, John T. Greany, Prizes; "Tote" Havaside, Ralph W. Myers, Handicap; John Doe, Richard Roe. The latter have promised a winning score to everyone.

New Shipping Commissioner. Charles W. Hendrickson has been appointed chief deputy shipping commission for the Washington district with headquarters in Seattle, according to an announcement by Fred M. Lathe, United States Commissioner for the Washington district. Hendrickson succeeds Frank H. Chandler, who retired June 30.



His friends on the Pacific Coast are glad to welcome Roy T. Crowder on his visit to our shores to confer with officials of the Panama Mail Service of the Grace Lines.

Port Official on Coast Visit. Philip H. Carroll, executive secretary of the Commission of Public Docks, at Portland, Oregon, has made visits to Pacific Coast ports recently with the idea in mind of gathering data on the subject of uniform ter-



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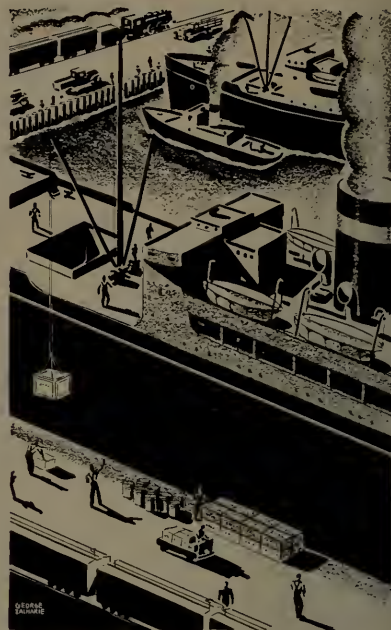
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annual rates, which he intends to submit to a special meeting of the commission.

Captain Candy Retires. Bringing to a close a notable sea career, which began in 1887 when he shipped as a mess boy on a sailing ship, Captain Henry A. T. Candy, commander of the turbo-electric liner *Pennsylvania*, relinquished his post on arrival of the vessel at New York on her last voyage.

H. A. T. Candy served during his early years at sea in sailing ships, principally between Europe and the west coast of South America, via the Strait of Magellan. He secured his master's license while still in sail, and one of his earliest commands was the clipper ship *Inverness*.

Captain Candy has been with steamship lines now owned by the Roosevelt International Mercantile Marine Company for 34 years, first with the Red Star Line and later with the American Line, serving for 16 years on the *Philadelphia*. He received his master's license in steam in 1915, and his first command was the *Finland* of the then newly organized Panama Pacific Line. From 1915 to 1917 he was back on the transatlantic run, this time as captain of the *Philadelphia*, later with the New York and the *St. Louis* while the latter were serving as armed transports. Captain Candy was decorated for bravery and meritorious service in saving the lives of 22 persons while in service on the *Philadelphia*, and he was awarded the Navy Cross for "important and hazardous duty" while in service on the transports.

He returned to the Panama-Pacific Line after the war, serving on the *Finland* and *Mongolia*. When the Panama-Pacific Line built the three fine turbo-electric liners *California*, *Virginia*, and *Pennsylvania*, Captain Candy was chosen to command each vessel as she made her initiation into the service and has remained on the *Pennsylvania* since 1929. Captain Candy is a resident of New York. He will be missed from the bridge of the *Pennsylvania*, as he was a distinguished figure in the intercoastal trade and held the admiration and respect of all those connected with shipping at the port of San Francisco.

Changes in Commanders. The retirement of Captain H. A. T. Candy as commander of the flagship *Pennsylvania* of the Panama-Pacific Fleet has necessitated changes along the line. The new commands



The well known smile of Captain Candy, popular skipper of the Panama Pacific Line, will be missed by his friends in California ports.

will be:

Captain James E. Roberts takes command of the *Pennsylvania*, going from a similar position on the *Virginia*. Captain George V. Richardson leaves the steamship *California* to step into Captain Roberts' place on the *Virginia*. Captain Robert A. Smith, who has been serving as chief officer of the *California*, has been promoted to the command of that vessel.

Captain Roberts is a lt.-cmdr. in the U.S. Naval Reserve and has been master of the *Virginia* since 1930. His first command was the *Kroonland* in 1924 and he has been associated with the International Mercantile Marine Company since 1906.

Captain Richardson is also a lieutenant-commander in the U.S. Naval Reserve. Captain Smith has held his master's paper for many years and has served as relief captain on the electric liners. He has made his home in San Francisco for the past year.

Compulsory Retirement. Under the government's Economy Bill, which was signed by the President June 30 and went into immediate effect, several of the best men in the services of the government having to do with the business of the Port of San Francisco were automatically deprived of their offices. The bill provided for the immediate

retirement of all members of the various government departments who had reached the retirement age, in most cases 70 years.

Captain John K. Bulger, supervising steamboat inspector for the First District, which included the ports of California and Oregon, was automatically retired. His absence from the department will be felt as a distinct loss, as he has been forty years in service and has exercised his duties as supervising inspector with a high degree of honesty and impartiality and has won the respect of all who have had any connection with the operation of shipping. Captain Bulger has announced that he plans to take a much needed rest.

W. B. Hamilton, well known as the veteran Customs Collector at the Port of San Francisco, also falls under the requirements of retirement, although he has been retained through a special order of the President until such time as a permanent successor shall be appointed.

Others in the Customs Department to retire under the provisions of the Economy Bill are: Henry E. Farmer, assistant collector; Newton S. Farley, deputy collector; James F. Hall, Ernest H. Hills, and Edwin D. Kellogg, inspectors; Charles C. Uyall, Arthur K. Sheats, Charles Thomas, and Sim A. Davis, clerks; E. N. Enlow, customs agent; Geo. A. Reynolds, examiner of merchandise; and Charles Kaplan, James F. Smith, James H. Smith, James P. Moran, Leonard Kjer, John T. Lloyd, and Wm. Thompson.

Newton S. Farley, retired deputy collector, has had a notable career in the customs service, having been appointed a clerk in 1885. He resigned April 1, 1890, to join the then extensive business of John D. Spreckels & Bros.; again joined the Customs Service in 1891, remaining in the service ever since. He enjoyed the reputation of being one of the customs officials best informed on United States laws governing the documenting of vessels, entrance and clearance of vessels, numbering motorboats, and handling bills of sales and mortgages concerning vessels.

Departs for France. Captain Barthélemy Aillet, who has made a name for himself on the Pacific Coast synonymous with the best in shipping executives, has left his post as Pacific Coast manager for the French Line and is being succeeded at his former San Francisco headquarters by Gilbert Macquer-



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young French shipping executive Captain Aillet has been promoted to the position of general agent of the French Line in Dunkirk, France, an important port in the company's services.

Macqueron takes over his new duties with a splendid background of shipping experience. He was born thirty-eight years ago in St. Omer, is a graduate of the University of Paris, where he took degrees of Bachelor of Science, Bachelor of Philosophy, and a degree of foreign languages; he speaks English and German fluently as his native French; he performed distinguished service for his country in the late war. Mr. Macqueron has been connected with shipping interests, and particularly with Henri Canguardel, since 1919. He brings to his position in San Francisco not only a fine reputation as a business man, but a love of sports, his favorites being swimming, golf, tennis, and motoring.

O'Connor Confirmed. The United States Senate recently approved the appointment of T. V. O'Connor as chairman of the Shipping Board for an additional term of six years.

Bilge Club Outing. The annual golf tournament and barbecue of the Bilge Club of San Pedro, comprising practically all the shipping fraternity of Los Angeles Harbor, was held last month at the Royal Palms and was attended by more than 200 members and their guests.

Bill McAdams, with a low net of 65, won the Bethlehem perpetual trophy. Jack Malseed had low gross, with a score of 83, and was awarded a black zipper bag, presented by Tubbs Cordage Company. Prize for the high gross went to Dr. J. A. Langan, with a score of 146.

An indoor baseball game was a feature of the day, with the Bilge Club winning from the Waterfront Scribes by a score of 15 to 7. Prizes were awarded to those giving outstanding performances in hitting, fielding, and work behind the plate. The baseball game made such a hit with the nongolfers that it was decided to make it an annual feature of the outing.

Albert O. Pegg is general chairman of the club, and William (Billy) Wickersham was chairman for the outing. Both deserve a lot of credit for marshalling a fine group of committee men.

Duty Well Done. Captain Engelbrekt Svedstrup, master of the Matson-operated freighter Golden



Hugh Mackenzie, passenger traffic manager, Dollar Steamship Lines, is shown congratulating Captain K. A. Ahlin, master of the Steamship President Coolidge upon setting a new record for the run between Yokohama and San Francisco. This turbo-electric ship, propelled by 13,250-horsepower Westinghouse synchronous motors, recently made the crossing in 12 days and 8 minutes, 4 hours and 4 minutes faster than the previous record held by the N.Y.K. liner Asama Maru.

Coast was the surprised recipient of his company's commendation last month. Captain Svedstrup was called to the office of Operating Manager Hugh Gallagher, and there in the presence of the entire force of dock executives listened to a short but sincere speech of appreciation for his services in saving the company's laid-up ships at Antioch from damage during a recent storm. Captain Svedstrup had been on temporary duty at Antioch when the storm arose, and at the risk of his own life, saved several ships from damage when they broke from their moorings. As a concrete proof of sincerity, the company presented the old skipper with an engraved gold watch. Captain Svedstrup was overcome with surprise and appreciation and could only murmur, "I only did my duty."

City Agent. The United Fruit Company now has William G. Fitch as city passenger agent at San Francisco. He was formerly Pacific Coast manager for the United States Lines, and has had consider-

able valuable experience in the steamship passenger business.

Transatlantic Conference Head. Emil Lederer who has for some time been in charge of the passenger traffic affairs of the Hamburg-American Line, has been unanimously chosen as Sole Arbitrator of the Transatlantic Passenger Conference, with full power to settle disputes and enforce agreements among the steamship lines. He entered upon his new duties July 1, with headquarters on the 25th floor of the Maritime Exchange Building.

On resigning from the Hamburg-American Line to accept this new position, Mr. Lederer terminated 37 years for this company, of which he was senior director in charge of passenger traffic. He is thoroughly familiar with the problems facing the operators in the transatlantic trade, and in commenting on his new responsibilities, he said, in part, "... The objectives to be achieved, as I understand them, are the effective control of competitive relations and the stabilization of the shipping business on a higher plane, in the interests of the companies themselves and their agents, of course, but more particularly for better and more efficient service to the traveling public."

In Charge. Captain William Fisher, for many years Supervising Inspector for the Eleventh District of the United States Steamboat Inspection Service in Seattle has been appointed to act also as head for the First District pending the appointment of a Supervising Inspector to fill the vacancy left by the retirement of John K. Bulger. Captain Fisher has been in charge of the district covering Washington, Idaho, and Alaska since 1918.

Inspector Retired. Herman Koeker, well known on the Pacific Coast as associate of Harry J. Summers, principal surveyor at Los Angeles Harbor for the American Bureau of Shipping, was retired recently and his position has been filled by Paul Thompson, transferred from the New York office.

Mr. Koeker came to the Pacific Coast in 1916 as hull superintendent in construction of the United States Navy submarines building for account of the Lake Torpedo Boat Company at what is now the Craig Shipbuilding Company, Long Beach. A year later he joined the Los Angeles Shipbuilding & Drydock Company.

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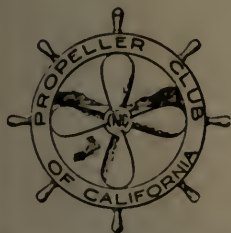
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ON Tuesday, Aug. 16, the Propeller Club of California's weekly luncheon meetings will be resumed, after a summer vacation period interval, and President Jim Cronin announces that the luncheon committee, headed by Bert Anderson, chairman, will soon be ready with details of the initial early fall program. During the first half of this year these weekly luncheon meetings presented many highly interesting talks on timely topics related to shipping and trade, and attendance marks testified to popularity of the programs.

— PC —

1932's Harbor Day at San Francisco is set for Wednesday, September 28, with President Cronin and the Harbor Day committee — Captain A. T. Hunter, chairman, H. T. Haviside, Captain J. A. Rumsey, Captain Stanley E. Allen, and Vernon Showell — now well under way on Propeller Club participation. On the occasions of the 1930 and 1931 Harbor Days, the Marine Committee of the San Francisco Junior Chamber of Commerce enlisted co-operation of our organization, and the coming Harbor Day program finds sponsorship and direction of the Merchant Marine Life Boat races in the capable hands of Propellers.

To the Harbor Day committeemen goes the establishment of rules for the races over the beautiful Marina course on San Francisco Bay; the securing of entries of competing crews from various commercial vessels in port; appointment of official starters, timers, judges, and announcers; release of publicity; and a welding together of all details into a successful working effort—a real job in any league. Personnel of the 1932 committee is the same



President James A. Cronin accepts striking gavel stand with appropriate words of appreciation.

as conducted the Merchant Marine Life Boat Races of the past two years.

— PC —

Three new members for the Propeller Club of California are an-



Captain Emile Topp, who brought the gavel base to San Francisco in behalf of the Propeller Club of New York.

nounced by Captain Stanley E. Allen, secretary treasurer. They are William Denman, W. E. Dryer, and Captain Mitchell Tyson.

— PC —

In Memoriam: Captain J. Martin Sivertsen, one of our popular members, who has passed on. He was for many years marine superintendent of the Fred Olsen Line.

— PC —

Prior to adjournment for the summer period, two excellent luncheon programs were enjoyed by our members. Captain Emile Topp, superintendent-commander of the California Nautical School, addressed the June 7 meeting, graphically describing the maiden cruise of the schoolship California State, a voyage from San Francisco to South American ports, and to Washington, D.C., and New York via the Strait of Magellan and home to California through the Panama Canal. Captain Topp at this meeting presented to President Cronin an attractive and useful gavel stand with compliments of President Arthur M. Tode of the Propeller Club of New York. President Cronin accepted the gavel stand in behalf of our membership with remarks of appreciation for the New York organization.

— PC —

Through the courtesy of H. T. Haviside and Herb Burns of the firm of Hirsch & Kaye, on June 14 we enjoyed a talking picture of famous Knute Rockne football plays and formations, reminding all that King Football is just around the corner again. It was one of the first demonstrations in San Francisco of a portable sound film projection unit.

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The National Magazine of Shipping

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SEPTEMBER, 1932

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Pacific Marine Review

VOLUME XXIX

SEPTEMBER, 1932

NUMBER 9

T. S. S. Manhattan Symbol of the Nation's Purpose

MANY of our Pacific Coast friends have manifested a very vital interest in the new organization of the United States Lines Company, and I wish to extend my appreciation of this interest and to claim for myself and my associates in this new combined venture the same whole-hearted cooperation that you have always given us in our other trades.

I feel that *Pacific Marine Review* is the natural medium for this message, since this magazine for thirty years has stood shoulder to shoulder with the Pacific Coast American shipowner in his struggle to establish and maintain those constructive principles and policies which are now beginning to win out and which are responsible in no small measure for the recent remarkable developments in the American merchant marine.

The shipowners and operators of the Pacific Coast during the past twelve years have found themselves in active competition with world shipping. This condition and the problems incident thereto will enable the Pacific Coast shipowner to appreciate the wisdom of operating a de luxe North Atlantic ferry service under the guidance of a combination of American shipowners whose fleets contact every major port in the world. The United States Lines Company is such a combination. Its purpose is to operate the steamship *Leviathan*, the steamship *Manhattan*, the steamship *Washington*, and such other vessels as may be deemed advisable in a de luxe express liner service on the North Atlantic ferry lanes, with the following objects in view:—

First, to use this service as a constructive advertisement to the shipping world that American ships can offer facilities for sea travel equal to the ships of any other nation.

Second, to make the best possible profit in this operation consistent with object number one.

We might say without boasting that the reorganized United States Lines has brought together the most powerful combination of shipping experience and executive ability that has ever been assembled in one firm during the course of American maritime history. We do say in all humbleness that this combination of executive ability and shipping experience would avail us nothing against the competition we are facing unless we were able to count on the whole-hearted cooperation and loyal support of the American people — our partners in this enterprise.

The advent of the new and palatial cabin class passenger liner *Manhattan* in the North Atlantic Trade is a very significant event from the standpoint of the American merchant marine. This vessel and her sister ship, the steamship *Washington*, are the largest commercial vessels yet built in an American shipyard. They are the first vessels in twenty-five years built for the North Atlantic passenger trade in an American shipyard. They are also the most definite and convincing symbols yet produced of the determination of the American people to keep American ships operating on the world's most competitive ocean highway.

Operation in the North Atlantic Ferry Lanes is no child's play. This route for generations has been the scene of fiercely contested battles between the world's greatest shipping giants. However, nothing about this route is more certain than the fact that a very large majority of the huge cargo and passenger traffic that flows over it each year is traffic that originates in the United States of America. It is obvious, therefore, that the whole-hearted cooperation of our partner, the American people, will fill our ships with passengers and cargoes and bring good success to all of us!

R. STANLEY DOLLAR.



Turbine Steamship Manhattan running 22 knots on her trials.

The Largest American-Built Liner

United States Lines Passenger Liner Manhattan, World's Fastest of her Type and the Largest Commercial Vessel Yet Built in an American Shipyard, Enters Service on the North Atlantic

MANY fine vessels have been built in American shipyards during the past ten years under the beneficial legislation of the Merchant Marine Acts of 1922 and 1928. These vessels are usefully engaged in our intercoastal and overseas trade and are bringing back to America her former prestige as a commercial maritime power. Latest, largest, and finest of these ships, the turbine steamship Manhattan, is of special significance because once more, after a lapse of twenty-five years, an American firm is entering the North Atlantic passenger ferry competition with an American-built passenger liner.

As we write these words (August 10) this splendid vessel, the latest word in craftsmanship and in marine engineering is clearing from New York for her maiden voyage in the world's most competitive ship lane. At her masthead flies the famous flag of the old American Line. The design of this flag—a blue spread-eagle on a white ground—disappeared from the Atlantic when the American Line discontinued its New York-Hamburg service in 1923 and was out of use until adopted by the United States Lines Company as a house flag for its fleet.

Turbine steamship Manhattan is truly representative of the American people. She is the most impressive result of the operations of the Merchant Marine Act of 1928, whereby the American people entered into an active partnership with the American shipowner in building up the American overseas merchant marine and the trade routes which it serves. Incidentally, this partnership has been of immense benefit to the American people in helping to tide over the unemployment situation. This is convincingly shown in the contract for the Steamship Manhattan and her sister the Steamship Washington, which was signed May 24, 1930, when the

unemployment cycle was at a very low ebb. Of the \$21,000,000 total involved, \$9,500,000 went directly to shipyard wages, \$10,500,000 went for materials, and \$1,000,000 for taxes, insurance, inspection fees, and freights. The \$10,500,000 went for materials and machinery, hardware, furnishings, carpets, tableware, and almost countless items. This amount was distributed over 43 states, and it is estimated that over \$8,000,000 went to labor charges somewhere along the line. In other words, the building of these two ships provided labor for over 5000 men for more than two years.

The design was one developed jointly by the owners and the New York Shipbuilding Company, builder of the vessels. These vessels were planned to operate as passenger and cargo vessels between Hamburg and New York, with calls at Cherbourg and Southampton. An extensive program of towed and self-propelled model tests at the Washington tank developed the best form for propulsive efficiency. Plans and specifications were drawn up embodying standards of strength, seaworthiness, and equipment in excess of the requirements of the 1929 International Convention for Safety of Life at Sea, the rules of the United States Steamboat Inspection Service, and the regulations of the British Board of Trade and of the United States Public Health Service. Classed by the American Bureau of Shipping, these vessels were given the highest rating, A.1 (E) with freeboard for North Atlantic passenger and cargo service.

In profile, the turbine steamship Manhattan is characterized by a straight raked stem, a good shear, two widely spaced well raked elliptical funnels, and a merchant cruiser stern. Her black hull and gleaming white superstructure accentuate these profile features and produce the appearance of a very able and com-

totally seaworthy craft.

Principal dimensions are:

Length over-all	705 feet
Length on waterline	685 feet
Length between perpendiculars as per classification rules	666 feet
Beam, molded	86 feet
Depth to "C" deck, molded	47 feet
Depth to promenade deck	75 feet
Camber "C" deck and above, in 86 feet	6 inches
Designed load draft	30 feet
Designed deadweight on 30' draft	12,000 tons
Displacement tonnage at 30' - 8 ³ / ₄ "	33,500 tons
Gross tonnage	24,289 tons
Net tonnage	13,924 tons
Normal speed in service	20 knots
Shaft horsepower in service	30,000

Principal Net Capacities:—

General cargo	380,000 cubic feet
Refrigerated cargo	47,000 cubic feet
Mail rooms	19,200 cubic feet
Baggage rooms, cabin	8,380 cubic feet
Baggage rooms, tourist	5,450 cubic feet
Baggage rooms, third	2,040 cubic feet
Ship's cold stores	16,000 cubic feet
Steward's stores	7,900 cubic feet
Bunkers at 97% of full tanks	4,775 tons at 38 cu. ft. per ton
Fresh water (potable)	616 tons
Fresh water (ship's use)	2,283 tons
Fresh water (reserve feed)	680 tons
Fresh water (distilled)	248 tons

Passengers:

Cabin	582
Tourist	461
Third	196
	1239

Crew 1717

Total passengers and crew

1717

Official Trials

On July 23, the Steamship Manhattan left the yard of the New York Shipbuilding Company, Camden, New Jersey, with a guest list of nearly 300 government officials and leaders in the marine industry, and proceeded to sea for her trials at the United States Navy measured mile off Rockland, Maine.

A four-hour run at 30,000 shaft horsepower, the water rate of her turbines to be 7.65 pounds per shaft horsepower hour at 375 pounds pressure per sq. in. and 650 degrees Fahrenheit easily meeting the guarantee of 7.75 pounds under those conditions.

On the measured mile, three runs were made on 10, 15, 18, and 20 knots speeds for standardization curves, and then five runs were made at full power. These runs demonstrated ample reserve power to maintain scheduled speed under extremely adverse weather conditions.

An 8-hour fuel consumption trial was then carried out at an average speed of 22.22 knots, 125.2 revolutions per minute propeller speed, and a developed shaft horsepower of 33,085. Consumption for all purposes per shaft horsepower hour of main turbines only was 0.618 pounds. Under contract guarantee conditions, which include the electric power developed, the fuel consumption is reduced to 0.597 pounds per horsepower hour. Under all conditions of load, the propulsion machinery and the hull operated with noteworthy smoothness and freedom from vibration, and it was the unanimous opinion of the experts aboard that the Manhattan combines form characteristics and propulsion plant that offer maximum propulsive economy, superb seagoing qualities, and outstanding comfort.

She was formally delivered to her owners, the United States Lines Company, at the New York piers of the International Mercantile Marine Company, on Wednesday, July 27, 1932.

Hull Design and Construction

The hull of Manhattan is constructed throughout of mild steel, steel forgings, and steel castings. She is a nine-deck vessel with decks named sun, boat, promenade, A, B, C, D, E, and F.

These decks have the following lengths: Sun deck, 284 feet; boat deck, 300 feet; promenade deck, 405 feet; A deck, 520 feet; B deck, 670 feet; C, D, and E decks, the full length of the ship; and F deck continuous only forward of machinery spaces and in No. 6 hold and over peak tank aft. All the decks, except D, E, and F, which are flat, have a camber of 6 inches in 86 feet. At the promenade deck the tumble home of the side shell plating is 2 feet but the deck extends to the full molded width of 86 feet, giving a 2-foot overhang on each side.

The framing is on the transverse system with scantling sizes determined by treating the ship as a single girder to the sun deck, no expansion joints being fitted in the superstructure. Double bottom tank depth is 5 feet 2 inches throughout except that in the forehold it increases to 8 feet at the collision bulkhead. Double bottoms extend well up the bilge. Frames are spaced 36 inches for the greater part of the length, spacing be-

ing reduced gradually to 24 inches at the peak tanks by graduations of 1 inch per frame forward and 2 inches aft. Solid floors, well lightened, are fitted at every frame in the double bottom. Bottom shell is 38 pound plate, side shell is 36-pound plate to A deck, 34-pound plate for A deck shear strake, and 32.4-pound plate to the promenade deck.

Side framing is of 12 inch channel to E deck, reinforced by 3½-inch reverse bar in holds 2 and 3. Above E deck, 8-inch channels are used. Liners are fitted at plate seams in way of the 12 inch frames, but the 8-inch frames are joggled. Deck beams are of bulb angle section where exposed in passenger quarters and channel elsewhere, and are supported by four rows of tubular pillars and plate girders.

The stem is in two pieces, the forefoot being a steel casting 3½ tons in weight and molded to the bulbous bow shape. This casting is provided with a projection to suit paravane gear. Upper section of the stem is of rolled steel 2½ tons in weight. Three steel castings, with a total weight of 43 tons, compose the stern post. Three steel castings, weighing 28 tons, make up the

frame of the double plate balanced stream-line rudder which swings on two gudgeons. This frame is connected by a large horizontal pad and fitted bolts to the 24-inch rudder stock—a single steel forging that weighs 24 tons and was made by the Camden Forge Company. Steel castings were made by the Sterling Steel Foundry and the Federal Steel Foundry.

The spectacle frame, in two pieces, is of cast steel, weighs 73 tons and was cast by the Penn Steel Castings Corporation.

Subdivision

Eleven main transverse bulkheads subdivide the hull into twelve watertight compartments. The four forward bulkheads extend water-tight to B deck, and the rest to C deck. Longitudinal fuel oil and fresh water tanks provide further subdivision in way of machinery space. Double bottom space is divided into 17 main tanks used for fuel oil, fresh water, feed water, and water ballast. This subdivision figures to keep the ship afloat with three compartments flooded fore or aft, or with four compartments flooded amidship.

Above C deck in way of all main bulkheads deep webs or partial bulkheads are fitted right up through the superstructure to provide against twisting and racking strains.

Water-tight Doors

Twenty-one electrically operated sliding water-tight doors are fitted in the bulkheads. Six are of the vertical type, 4 feet 6 inches high by 2 feet 6 inches wide, and are located to give access between the machinery spaces and into the shaft alleys. Fifteen are of the horizontal type, 6 feet 3 inches high by 2 feet 6 inches wide, and are located on E deck to give access between the various quarters. The Cutler-Hammer electric power system is used for operating these doors.

A central control board in the wheel house is used to close the doors either singly or as a group in sequence, and to open the doors singly. An audible signal at each door gives the alarm when the door starts to close. Colored lights at the central board indicate doors open, moving, or closed; time to close singly about 80 seconds, as a group in sequence about 2 minutes. A local switch provides for operation from either side of the bulkhead. After all doors are closed any one can be opened by the local switch and will automatically be closed again by the central control. Any local station may be locked in emergency so that it cannot be opened from the central control board.

A hand drive at each door automatically clutches in if the power drive goes off. This hand drive is operative from either side of the door or from a station above the bulkhead deck.

Arrangement of Spaces

Aft of the forepeak and forward of the machinery spaces there are three large cargo holds under E deck, with crew's quarters on E, D, and C decks above the two forward holds, and with mail rooms, cabin baggage rooms, and swimming pool on E deck above Hold No. 3.

Aft of this hold and under E deck are a block of fresh water tanks; a coffer dam; a block of fuel oil tanks; the forward boiler room; the auxiliary power and machinery space; the after boiler room; the engine room; the refrigerating machinery space with refrigerated cargo hold No. 4; and refrigerated ship stores above; general cargo hold No. 5; general cargo hold No. 6; and the after peak tank. The boiler rooms and auxiliary machinery spaces are flanked with side tanks for fuel oil. These tanks are formed by a longitudinal oil-tight bulkhead extending to E deck, the

tank tops being formed by a coffer dam 3 feet below E deck. This feature gives a double shell plating effect in a very vital region.

On E deck amidships are located crew quarters and mess rooms; steward's stores; crew and third class galleys; third class dining room; third class staterooms; and steering gear.

The swimming pool and gymnasium and some cabin class staterooms are on the forward midship section of D deck, and the remainder of that deck aft is devoted to tourist class staterooms, with an emergency steering room at the after end.

On C deck forward amidship section is the cabin class entrance foyer with cabin class staterooms and cabin class dining room. Following aft are the main galley; the tourist class dining room; the tourist entrance foyer; tourist staterooms; third class lounge; and third class open promenade.

A and B decks are devoted to cabin class staterooms forward, with tourist lounge, smoking room, and promenade aft on B deck, and tourist games space aft on A deck.

On the promenade deck are the main cabin class public rooms, palm court, grand salon, writing room and library, smoking lounge, and veranda cafe, and an extensive games or open air dance space at the after end.

Captain's and deck officers' quarters are on the boat deck forward, with engineers' quarters and mess room aft. Children's playroom and deck are also on this level aft. Sun deck supports the wheel house bridge and chart room forward and a large open cabin class games deck between the stacks.

Hull Equipment

One of the most important items in the hull equipment of the Manhattan is a Pacific Coast product. This is the electric motor-driven winchlass supplied by Allan Cunningham of Seattle. Of the horizontal spur-gear type with two wildcats and two gypsy heads, this winchlass is driven by two 90-horsepower Westinghouse motors. The wildcats may be operated either independently or jointly by either or both motors. Each cat is capable of hoisting one 21,560-pound anchor with 30 fathoms of 3-7/16 Naco cast steel stud-link anchor chain at a speed of 5 fathoms a minute. The motors are totally enclosed, water-tight, and control is arranged for creeping speed on first point hoisting and for dynamic braking.

An auxiliary steering gear of the motor-driven quadrant type is installed on D, the deck above the main steering gear. The cast steel quadrant is mounted on a 12-inch diameter extension of the rudder stock and is driven through spur and bevel gearing by a 25-horsepower Westinghouse motor.

Cargo Handling Gear

Cargo holds on the Manhattan are served through six hatches. At No. 1 hatch four 3-ton booms mounted on kingposts are served by four 3-ton winches. No. 2 hatch has three 3-ton and one 20-ton cargo booms mounted on the foremast and served by three 3-ton winches. Nos. 3, 4, and 5 hatches each have three 3-ton booms mounted on masts and each hatch is served by three 3-ton winches. No. 6 hatch has four 3-ton booms mounted on kingposts and served by four 3-ton winches.

The winches are all Lidgerwood and each is driven by a 35-horsepower, 230-volt, 480-revolutions per minute Westinghouse direct-current, compound wound, totally enclosed, water-tight, mill-type motor with full torque water-tight solenoid shoe type brake. All have

Forty-three states of the Union contributed materials or equipment for the construction of T.S. Manhattan. Among the several contributions from the Pacific Coast was this electrically operated windlass for handling the anchor chains of the giant liner. It was built by Allan Cunningham of Seattle, and is the most powerful ever installed on a commercial vessel in America. The motors and control are by Westinghouse. There are two motors, each developing 90 horsepower.



the following load and speed characteristics:

6720 pounds (3 tons)	at 215 feet per minute
3500 pounds	at 281 feet per minute
2000 pounds	at 323 feet per minute
1325 pounds	at 420 feet per minute
Light Line	at 700 feet per minute

Control and wiring for two of the winches are arranged so that they will handle 4-ton loads at a speed of 190 feet per minute.

Stores are taken on board through a cargo port amidship to the hatch at center of the working passage on D deck. A 1-ton jib crane serves this hatch in association with a 1-ton 'tween deck winch of the motor-driven, single-drum, double-gear type, equipped with one winch head. The winch is capable of handling one ton at a speed of 150 feet per minute with a single whip. Motor is of 13 horsepower, 775 revolutions per minute, 230 volts direct-current, series wound, totally enclosed, mill type, with full torque water-tight solenoid shoe type brake.

The 18-inch quadruple blocks for the 20-ton boom are of special extra heavy plate extended, with cast steel sheaves, bronze bushed. All sheave pins are bored and counterbored and fitted with Alemite connections.

For the 3-ton booms the blocks are Metalined bushed with cast steel sheaves. These blocks were furnished by W. M. McMillan's Sons, who also supplied the rigging blocks.

Refrigeration

The refrigerated cargo hold, served through No. 4 hatch, has a capacity of 47,000 cubic feet measured inside of gratings and pipe battens and is divided into four chambers, the lower end of trunk hatch being used as a handling and access room. On E deck above this hold there are ship's refrigerated storerooms for meats, fruits, vegetables, fish, butter, eggs, and milk, ice cream, and poultry, with a total net capacity of 16,000 cubic feet. Insulation is cork slab on bulkheads ceilings, and floors, with mineral wool on ship's side, all laid up in combination with water-proof sheathing paper and lined with tongue and groove spruce. Flooring is finished with 1½ inches of cement laid on a lead pan. Brine circulation is used for cooling.

The refrigeration plant consists of: three vertical double cylinder single-acting Brunswick-Kroeschell 5

x6-inch marine type carbon dioxide compressors, each driven direct by a 115-horsepower, 250 327 revolutions per minute, 230 volt, compound wound Westinghouse motor; and the usual complement of condensers, evaporators, brine circulating pumps, and control apparatus. The refrigerated capacity of each unit is 37.6 tons per 24 hours at plus 5 degrees suction temperature and 86 degrees gas temperature. Two of these units would be of ample combined capacity to meet the most severe demands of the refrigerating chambers. The third machine takes care of the cooling requirements for the air conditioners of the dining rooms.

Six General-Electric automatic refrigerator cabinet units are installed in various pantries with capacities ranging from 6 to 60 cubic feet.

Ballast System

An 8-inch clean ballast main runs fore and aft through the engine and boiler rooms connected with a 5-inch main running through the starboard shaft alley at the thrust recess bulkhead. The forward end of this main terminates in a double valve manifold, port and starboard, in the forward boiler room. All the forward ballast compartments are controlled from these manifolds which are arranged to permit the carrying of fresh water (for ship's use only) in double bottom tanks No. 2 and No. 3 and wing tanks No. 5 and No. 6 adjacent to the cofferdam forward of the boiler room. These manifolds are also connected to the fresh water main for ship's use. The valves controlling these tanks are fitted with a locking device which prevents the opening of both valves at the same time and only by deliberate intent could a mixture of salt and fresh water occur. A 6-inch suction is led from the main to two clean ballast pumps, one located in the aft boiler room and one in the engine room.

An independent 8 inch ballast main is led from the two oily water ballast and bilge pumps connecting with the double manifolds located in the fore and aft boiler rooms, which control the suction to the wing and athwartship fuel oil tanks adjacent to the boiler rooms and auxiliary machinery room and to the double bottom tanks No. 4, No. 5, and No. 6 under these rooms. These manifolds are also connected to the fuel oil transfer mains. All valves are fitted with locking device as described above. The clean water ballast pumps

draw from the sea or tanks and discharge overboard. The oily water ballast and bilge pumps draw from the tanks and bilges to which they are connected and discharge either overboard direct or through the oily water separator. The clean ballast main and the oily ballast main are entirely independent. The piping of the bilge and ballast systems comply with the rules of the International Convention on the Safety of Life at Sea.

Bilge System

A bilge main runs fore and aft through the engine and boiler rooms to which are connected all bilge suction within these spaces. This main also connects with the aft bilge main running through the starboard shaft alley and controlling all the bilges aft of the engine room. The forward end of the main is connected to a bilge manifold, port and starboard, located in the forward boiler room to which all the bilges forward of the boiler room bulkhead are connected. A 6-inch suction is led to the oily ballast and bilge pump in the engine room and to similar pump in the after boiler room. The connections at the pump permit of discharge directly overboard or through the oily water separator located in the engine room. An emergency submersible bilge pump located in the forward boiler room is connected to the bilge main with an independent discharge overboard. All valves in the main, in the branches, and from the bilge manifolds are operated at the valve and above the bulkhead deck.

Fuel Oil Transfer and Filling System

The fuel oil deep wing tanks, athwartship, deep tanks, and the double bottom tanks No. 4, No. 5, and No. 6 in way of the boiler rooms are arranged for use either as full storage tanks or for ballast.

A common suction or suction to each tank leads to a double manifold for drawing either fuel oil or ballast. The oil side of the double manifolds connects with an 8-inch main leading to two fuel oil transfer pumps, one located in the forward boiler room and one in the aft fire room and arranged to transfer oil from forward tanks to after tanks, or vice versa, from port to starboard as required for trimming purposes, to the settling tanks for boiler service, and overboard. The filling main runs from the fuelling stations, port and starboard, on D deck to the 8-inch main in the auxiliary machinery room. The fuel oil storage tanks are arranged in three groups; namely, forward group in way of forward boiler room, center group in way of auxiliary machinery room, and aft group in way of aft boiler room. Eight-inch overflows are provided at the shell for each group located below the test head permitted for these tanks. An air escape from the overflow main of each group leads to the atmosphere about 20 degrees above the fidley top, thus avoiding any odor of gas flooding the quarters.

Oil in the 40 oil fuel tanks is measured by Harspar gauges, arranged in convenient groups within the two fire-rooms so the oil distribution in the various tanks may be readily ascertained.

Ventilation and Heating

Including the boiler and engine spaces, eighty-seven electrically driven Sturtevant fans provide for the delivery and exhausting of air. These fans are mounted on special foundations and operated at low speed to ensure silent operation and below the weather decks are located in sound-proof fan rooms with steel bulkheads. The cabin and tourist dining saloons are provided with air conditioning systems designed and furnished by the Carrier Engineering Corporation and installed by the New York Shipbuilding Company. Two

conditioner units serve each room, each unit consisting of a preheater, a washer, and cooling and heating coils. Air enters the rooms through specially designed ceiling grilles at a low velocity but ample volume thereby eliminating all drafts.

The ventilation systems to all parts of the vessels were designed in collaboration with Thermotank Limited. Air is distributed to all cabin, tourist, and third class accommodations through punkah louvers. This air can be heated to maintain a temperature of 70 degrees when necessary, by fin tube heaters attached to the fans.

The natatorium and swimming pool is equipped with both supply and exhaust systems. The supply system is arranged with heaters that give a temperature in these spaces 10 degrees higher than in the living spaces.

All galleys have independent supply and exhaust systems. The main galley being located between the cabin and tourist dining saloons, the exhaust system has been designed with a 100 per cent. greater capacity than the supply system. This assures the positive prevention of galley fumes and odors permeating the dining rooms.

Exhaust systems are provided from all public and private baths, showers, and toilets. Each public room has its supply system and they are heated by steam radiators concealed behind metallic ornamental grilles. All ducts in cabin and tourist accommodations are concealed behind ceilings, the louvers only being visible. All systems equipped with heating facilities are insulated with asbestos cellboard to prevent losses and to ensure uniformly heated air along all delivery points in the ducts.

With all vent systems on the vessel operating at one time, the fans, exclusive of the boiler rooms which have a forced draft blower system, handle a total volume of 458,000 cubic feet per minute distributed as follows:

Staterooms and public spaces—210,900 cubic feet supply, change of air complete every five minutes.

Public and private baths, toilets, showers, 46,400 cubic feet exhaust, change of air complete every four minutes.

Galleys—20,500 cubic feet supply—41,800 cubic feet exhaust change of air complete every 2 minutes.

Cabin dining room—18,100 cubic feet supply—change of air complete every 4½ minutes.

Tourist dining room—9,500 cubic feet supply, change of air complete every 4½ minutes.

Third class dining room—4,000 cubic feet supply, change of air complete every 4½ minutes.

Machinery spaces (except boiler rooms) 96,000 cubic feet supply, 11,400 cubic feet exhaust, change of air complete every two minutes.

Further provision for the heating of cabin state rooms has been made by fitting Murray brass-finished, cabinet-enclosed radiators, furnished by the American Radiator Company of New York. These radiators may be considered as booster elements and are heated by hot water supplied from the ship's hot fresh water circulating system.

A two-pipe steam heating system at 45 pounds pressure is fitted with separate radiator in all public rooms, public toilet and officers' and engineers' quarters on the boat deck. Steam is supplied by the high pressure evaporator and the returns are led back through Cochran multiport drainers to the high pressure evaporator drain tank. This system is arranged in sections so that any section may be shut off for examination and overhauled with the minimum disturbance to adjoining sec-

tions. Radiators fitted in the public rooms are concealed behind metallic ornamental grilles. Radiators in public toilets and officers and engineers' quarters are cast iron wall type. Bran coil radiators are fitted in the pilot house and chart house, 25,400 feet of extra heavy Toncan iron pipe and 900 feet of polished white metal pipe was used in installing this heating system.

Water Service and Sanitary Arrangements

Elaborate plumbing arrangements are provided in the passenger and crew accommodations. All exposed plumbing pipes and fixtures in the passenger and crew quarters are of white metal and all basin faucets are of the slow self-closing type. Hot and cold fresh water is supplied to all lavatories, bath tubs, and showers throughout the vessel while cold salt water is used for flushing all water closets and urinals and supplying all slop sinks. Mott plumbing fixtures are used throughout.

The water services are pressure systems arranged in sections so that when repairs are required the section concerned may be shut off for examination and overhauling without disturbing other sections. Iced drinking water is circulated to public drinking fountains on the various decks and to galleys, pantries, mess rooms, and service bars.

The soil lines drain overboard independent of all other piping. The pipes in each water tight compartment are installed independently of the pipes in adjacent water-tight compartments and run in two mains

along the ship's side, one port and one starboard, each main having only one discharge overboard with a flap valve and a balanced vertical check valve at the shell, thereby cutting down to a minimum the holes in the ship's side.

All sanitary discharges from the accommodation on the E deck are led to seven duplex Ansonia sewage ejectors. This system is independent in each water-tight compartment. Each unit comprises two collecting tanks, each tank being independent of the other and cross-connected, so that, in the event of one tank being out of action from any cause, the other tank is ready for use. These units are operated automatically by compressed air generated at a central power station.

All soil and drain lines are well vented at the high and low points. These vents are collected together in groups and run up in risers fitted with goose necks about 8 feet above the highest obstruction on the highest weather deck in that section of the vessel. 9200 feet of polished white metal pipe and 54,800 feet of extra heavy Toncan iron galvanized pipe were used in installing the hot and cold fresh water, ice water, drinking water, and salt water sanitary systems. 1200 feet of polished white metal pipe, 14,300 feet of extra heavy Toncan iron galvanized pipe, 13,500 feet of lead pipe, and 220 feet of copper pipe were used in installing the plumbing drains. 6400 feet of Toncan iron galvanized pipe were used in installing the vents from soil and drain lines.

Propulsion Machinery Plant

In arrangement, design, and installation, the propulsion plant of the turbine steamship Manhattan is the product of the Engineering Department of the New York Shipbuilding Company. As a whole it is a very rugged, dependable, commercially sound installation, equal, if not superior in economy, to any marine plant of its type.

Twin screws are each driven by an independent set of single reduction gear triple turbines of the Parsons type, taking steam at 390 pounds pressure absolute and 50 degrees Fahrenheit temperature at the throttle from six express type water-tube Babcock & Wilcox boilers operating under closed stokehold forced draft with preheated air.

Steam Generating Plant

The six boilers are in two rooms, separated by the auxiliary power plant space. Each of the two stacks receives the uptakes from the three boilers. Each boiler has one steam drum, two water drums, two superheaters, two air heaters, and ten Cuxama type oil burners. Steam generating heating surface is 10,500 square feet, superheating surface 2507 square feet, air heating surface 8207 square feet, and furnace volume 1262 cubic feet for each boiler. Steam pressure in the drum is 409 pounds per square inch, and at the superheater outlet 401 pounds. Two safety valves are fitted on each steam drum and one on each superheater outlet, all of Consolidated Aschroft-Hancock type. All boiler stop valves are of the Lunkenheimer cast steel extra heavy pattern. Hough and Egbert main and auxiliary combined feed stop and check valves are fitted to the front end of each steam drum. Two Dewrance type water gauges with Jerguson flat glasses are fitted to the steam drum head and the water column on the front of each boiler.

A Stets float-controlled balanced piston valve type automatic regulator is installed in the main feed system of each boiler. Six Diamond soot blowers on each boiler assure clean heating surfaces.

A Ranarex carbon dioxide indicating and recording system in each fire room, with pipe connections to the uptakes and stack, guards against poor combustion.

An interesting feature of this plant is the installation of a high capacity high pressure evaporator in each fire room to take care of demands for low pressure steam for heating the ship, heating fuel oil, cooking, and make-up distilled feed water. Taking steam at 375 pounds gauge and 650 degrees Fahrenheit and with feed temperature at 150 degrees Fahrenheit, each evaporator has a capacity to deliver 26,000 pounds of steam per hour at 125 pounds pressure. These evaporators are of the cylindrical, horizontal shell, bumped head type fitted with Stets feed regulators and Foster drain regulators. They were designed by the New York Shipbuilding Company and built by Babcock & Wilcox. All raw reserve feed water passes through a Cochrane Corporation deaerating heater and into the feed tank of one of these evaporators.

Combustion air is drawn from the top of the fidley by four Sturtevant forced-draft fans in each fire room. These fans, each of which has a capacity for 20,300 cubic feet, drive the air through the preheaters at the rear of boilers and deliver it to the common closed stokehold space.

The two Davis Engineering Corporation Vertical Niclausse tube-type oil heaters in each fire room raise the fuel oil from 60 to 300 degrees Fahrenheit, each heater having a capacity for 12,000 pounds of oil an hour.

For fuel oil service in each fire room, there are three



The steam generating plant of the T.S. Manhattan operates on the closed stokehold forced-draft system. Our illustration shows the forward fire room with its three Babcock & Wilcox express-type water-tube boilers. At the left of the illustration may be seen the forward end of the high pressure evaporator which takes care of the demand for low pressure steam and for make-up distilled feed water. The illustration below shows the operating platform for taking care of steam distribution in the engine room and regulating the throttles of the turbines.

motor-driven Quimby vertical gear-in-head screw-type pumps, two of 34 gallons per minute capacity each at 300 pounds pressure and one of 300 gallons a minute capacity at 75 pounds pressure. As an emergency stand-by unit there is installed in each fire room a Worthington 6½x3½x8-in. vertical simplex steam-driven pump having a capacity of 22 gallons a minute at 300 pounds pressure. These service pumps have Schutte-Koerting duplex type strainers in both suction and discharge lines and are controlled from burner line pressure by Swartout Class B master control apparatus. A motor-driven 2½-gallons-per-minute Northern rotary pump is installed in No. 2 boiler room and is used for starting purposes when no steam is available. This unit, which takes power from the emergency diesel-generating set, is also used to transfer diesel oil from the storage tank to the service tank in diesel-generating room.

For each high pressure evaporator there is a geared motor-driven triplex feed and drain pump and a vertical simplex pump for maintaining water-feed tank level. A vertical simplex emergency main boiler feed pump is installed in each fire room, and in No. 1 fire room a vertical simplex fire and bilge pump, and a vertical motor driven, fully submersible, self-priming, centrifugal pump with suction connected to the main bilge system. This latter pump has a capacity of 500 gallons a minute against a 40-foot head. All of these pumps are of Worthington make.

In No. 2 fire room there are two horizontal motor-driven self-priming Nash centrifugal bilge and ballast pumps fitted with the Nash Hytor vacuum unit and suction controller. Each of these units will discharge 475 gallons a minute at 60 feet head.

Two lines of main steam pipes are installed, one port and one starboard. Both lead from No. 1 boiler room to bulkhead stop valves at the operating platform in the engine room and are so cross-connected that steam from any one or from all of the boilers may be supplied to the engine room through either or both lines. These pipes are installed with generous expansion bends and all joints are of the Van Stone type.

Main Turbines

Propulsion turbines were designed and built by the New York Shipbuilding Company. Each unit consists



of a high pressure ahead turbine, an intermediate pressure ahead turbine, a low pressure ahead turbine, a high pressure astern turbine, and a low pressure astern turbine. Each of the ahead turbines is connected by flexible coupling to a pinion. The high pressure astern turbine is in a separate casing and is connected in tandem with the intermediate pressure ahead turbine, the low pressure astern turbine is incorporated in the forward end of the low pressure ahead turbine.

The high pressure ahead turbines are of the impulse reaction type and have the following notable features: Cast steel casing; solid forged steel rotor; impulse and nozzle blades machined from corrosion resistant rolled steel; impulse blades fitted into dove-tailed grooves and shrouded with bands secured by riveting blade tenons; and end-tightened reaction blading of manganese copper.

Intermediate pressure ahead turbines are of the reaction type with cast iron casing; rotor of high grade steel forging with axial holes bored through to balance end pressure; and blading of hard drawn brass.

Low pressure ahead turbine is of double flow balanced reaction type with: cast iron casing; built-up

steel drum type rotor; and blading of hard drawn brass.

High pressure astern turbine is of impulse type with: corrosion resistant steel nozzles and blades; cast steel casing; and steel forged rotor. It has two rows of blading, takes steam direct from boilers and exhausts into the low pressure astern turbine which is also of the impulse type with two rows of monel metal blades and monel metal nozzles.

High and intermediate pressure ahead turbines have radial dummies arranged for positive thrust at all normal speeds and all three ahead turbines are fitted with generously proportioned Kingsbury type bearings to take care of unbalanced thrust.

All nozzle rings are of steel in a patented built up design. All ahead turbines run at 1500 revolutions a minute at the rated output of 15,000 shaft horsepower to each propeller shaft on 85 per cent. of the full nozzle area. A by-pass is provided on the first section belt of the high pressure ahead turbine to permit of economical operation with 100 per cent. nozzle openings.

All turbine glands are of the labyrinth design and are arranged with a common sealing and leak-off system regulated to a pressure of about 1 pound gauge. The outside chambers of all glands are connected to a fan and condenser by a system of piping so arranged as to prevent any leakage of gland vapor into the engine room. Sealing steam is supplied from the auxiliary exhaust line and is provided with a deadweight regulating valve to give the desired pressure. Each propelling unit has an independent gland system.

In order to provide for the protection of the main turbines in the event of the turbine speed exceeding a predetermined limit, an emergency governor has been fitted to the low pressure turbine and is arranged to close the throttle at about 145 revolutions per minute of the main shaft which corresponds to about 1740 revolutions per minute of the turbines. Provision has also been made to admit live steam under reduced pressure direct to the intermediate pressure turbine and run the set as a compound unit should it be desired for any reason to eliminate the high pressure turbine from the series. Similarly the high pressure astern turbine may be eliminated as a power unit and live steam admitted to the low pressure astern turbine.

A motor-driven turning gear is attached to the after end of the intermediate pressure pinion and is arranged so that when the gear is engaged a red warning light

is shown on the main gauge board near the ahead and astern throttle so as to prevent steam being turned on turbines while turning device is in gear.

Main Reduction Gears

The main reduction gearing is of the Falk Company standard, double rehel, single reduction type. The main gear wheels are 161.429 in pitch diameter with a total width of face of 62 inches. All pinions have a pitch diameter of 13.429 inches and are connected to their respective rotors by flexible jaw-type coupling. The speed of the main gears is 125 revolutions per minute and the pinions all run at 1500 revolutions. The gear teeth have a diametral pitch of $3\frac{1}{2}$ inches and the helical angle is about 30 degrees. The teeth of the gear wheels and pinions are cut on a specially designed hobbing machine ensuring perfect tooth contact and smooth quiet running. The gears and pinions have been dynamically balanced up to and including revolutions that are 15 per cent. above the normal running speeds. The gear wheel and pinions of each set are enclosed in a strong, well ribbed, cast iron case which is attached to strongly constructed foundations.

Main Condensers

There are two independent main condensers of the single-pass type, one for each propelling unit and located outboard of the low pressure turbine so that the exhaust openings are approximately in line with the exhaust outlets at each end of the low pressure turbine, thus avoiding offsets in trunks. Each main condenser has about 16,500 square feet of cooling surface. The tubes are made of Ambrac metal containing not less than 30 per cent. nickel and are $\frac{3}{4}$ inch outside diameter by No. 16 B.W.G. thick. All tubes are secured by expanding on the inlet end, and with ferrules and packing at outlet end.

The condenser shells are made of steel with riveted steel flanges for attaching tube sheets and trunks. There are three tube supporting plates equally spaced so that the exhaust from each turbine will pass through a uniform tube bank at each end. The upper group of tubes are spaced $1\frac{1}{2}$ inches centers and the spacing gradually decreases to 1-1/8 inch. The net area between tubes is such as to provide a uniformly decreasing steam lane such that the absolute pressure drop between top and bottom of condenser at full power will not exceed $\frac{1}{4}$ inch mercury.

The condensers are fitted for scoop circulation and, in addition, circulating pumps are installed for low powers and harbor use. Inlet connections are fitted

The main propulsion units of T.S. Manhattan consist of two sets of 3-stage Parsons type turbines designed and built by the New York Shipbuilding Company and two sets of single reduction gearing designed and built by the Falk Corporation. Our illustration gives a view looking forward between these two units on the lower platform of the engine room.



with rubber seated balanced nonreturn valves arranged to close when auxiliary circulating pump is in use at low speeds and maneuvering. The condensers and scoops are designed to maintain a vacuum of 29 inches when operating at full power and with circulation water at 70 degrees Fahrenheit. The scoops are arranged to utilize the velocity head of the ship's speed. The two main condenser circulating pumps are of the Worthington vertical screw type, each driven by a 165-horsepower Sturtevant turbine and having a capacity of 18,000 gallons a minute at 1090 revolutions a minute.

Each condenser is equipped with a set of Westinghouse 2-stage air-ejectors fitted with inter-cooler and after-condenser. There are two Worthington motor-driven vertical centrifugal combined condensate and turbine drain pumps for each condenser. Each condensate pump has a capacity of 300 gallons a minute against 29 inches vacuum in the condenser. Each turbine drain pump handles 15 gallons a minute under the same vacuum conditions. The condensate is discharged as circulating water through the air ejector condensers to the main feed tank hot well from which the feed pumps take their suction. Thus the steam and feed water cycle is practically in a closed system designed to keep the feed water as free from air and impurities as is practically possible.

There are two main and one auxiliary feed pumps all of the De Laval horizontal, 4-stage, centrifugal turbine driven type. Each main feed pump has a normal capacity of 630 gallons a minute at 500 pounds pressure, and the auxiliary feed pump throws 100 gallons a minute at 500 pounds pressure. Capacity of each main pump is sufficient to supply the normal needs of all six boilers. One Worthington motor-driven vertical single-stage centrifugal pump installed in engine room is used to transfer excess distilled water from the feed tank in engine room to reserve distilled feed water tanks forward of No. 1 boiler room or for the reverse cycle.

The feed pump discharge is carried to the feed water heaters. There are two of these heaters both of the Schutte-Koerting horizontal straight-tube 4-pass type, each with 1000 square feet of heating surface and a capacity of 335,000 pounds of feed water per hour heated from 110 to 225 degrees Fahrenheit in the primary heater and from 225 to 300 degrees Fahrenheit in the secondary heater with the heating steam bled from the intermediate turbine casing at 70 pounds pressure.

Lubricating Oil System

Each propulsion unit has a separate and independent forced lubricating system. Each system is operated by two Quimby vertical motor-driven valve-in-head screw type pumps, either of which can take care of all normal requirements. These pumps draw oil from the sump under the reduction gears and force it through duplex strainers and Griscom-Russell oil coolers to all bearings. A gravity tank is installed at sufficient height to maintain proper pressure on discharge system and insure an ample supply of oil in case of pump failure. There are four coolers each with a cooling surface of 917 square feet and capable of cooling 30,000 gallons of oil an hour from 105 to 95 degrees Fahrenheit. A reclaiming tank fitted with steam coils is of sufficient capacity to hold all the oil in one system. Two De Laval lubricating oil purifiers are installed, each with a capacity for 300 gallons of oil a minute at 160 degrees Fahrenheit.

Auxiliary Machinery

An auxiliary machinery space is located at center line of ship, in hold, between No. 1 and No. 2 boiler

rooms. A flat, or partial deck, divides this space, vertically, into an upper compartment for the turbo-generators, switchboard, etc., and a lower compartment for the usual necessary auxiliaries not previously described.

The four 500-kilowatt turbo-generator sets exhaust into two condensers located one under each two generator sets. For the condensers there are two air ejector units each consisting of two 2-stage air ejectors mounted on an inter and after cooler similar to those described for main condensers. These units are supplied by the Westinghouse Electric and Manufacturing Company.

Two motor-driven, horizontal, single-stage, double-suction, centrifugal pumps of 3600 gallons per minute capacity circulate water for the dynamo condensers.

Three motor-driven, vertical, single stage, Worthington centrifugal pumps of 40 gallons per minute capacity, remove condensate from dynamo condenser, discharging same through air ejector condensers to port, or dynamo, feed tank. One pump serves each condenser and the third pump is a stand-by for either condenser.

One De Laval turbine-driven feed pump for port service and one 400-gallon feed tank are installed in conjunction with the turbo-generator condensing units.

Two fire pumps, two pumps for salt water sanitary service and deck wash, two fresh washing water pumps, two hot fresh water circulating pumps and two drinking water pumps are installed. These are all Worthington centrifugal pumps driven by Westinghouse motors.

There are also two salt water evaporators of the Reilly, vertical, low-pressure type, arranged to operate single or double effect and each having a capacity of 25 tons per 24 hours operating single effect and 33 tons running double effect. Two drain coolers, of the vertical, two-pass, straight tube type, each handle 4000 pounds per hour of evaporator coil drainage, using distiller overboard discharge for circulation.

In conjunction with the above evaporators there are two Reilly, vertical, marine coil type distillers each having a capacity of 25 tons per 24 hours. The system also includes two deaerating filters and a 100-gallon, two-compartment, distilled water test tank. The evaporators are equipped with improved automatic feed and drain regulators.

Two fresh water storage tank heaters, of the vertical type with horizontal U-tube heating elements, are installed. With a storage capacity of 475 gallons each unit is capable of heating 15 tons of water per hour from 50 to 140 degrees Fahrenheit with steam at 90 pounds gauge. The heating elements have provision for subcooling drains, thermostat controlled valves being installed both in steam supply and drain outlet.

Starting Platform

The starting platform is arranged with a view to giving the greatest ease of handling and maneuvering and the usual gauges, telegraphs, etc., are fixed in convenient positions. In addition to the instruments there are indicator lights for forced draft blowers, lubricating oil system, various ventilation fans, as well as rudder indicator, feed tank, water level indicator, and emergency hand control for main steam bulkhead valve.

The gauge board bulkhead is so placed that only the hand wheels of steam valves are visible on operating platform and the space housing the valves and steam pipes, strainers, etc., is connected to an exhaust fan for the purpose of eliminating, as far as possible, excessive heat in way of operating platform.

Workshops

Two workshops are provided, one adjacent to working platform and accessible from main engine room, the other on E deck, reached by passage from auxiliary machinery hatch.

In engine room workshop there is installed one 22-in.x10-in.x12-ft. extension gap lathe, one 30-inch gliding head drill press and one emery grinder. In workshop on E deck there is fitted one 12-inch by 8-foot star lathe, a shaper, grinder, drill press, and power saw.

Fire Extinguishing Apparatus

There is a complete Foamite fire extinguishing system fitted in the machinery spaces of the Foamite generator type. The generator and control valves for the system are located in a central fire control station outside of machinery spaces.

Each boiler room is equipped with a set of Foamite distributors located under floor and protecting the entire area under boilers and floor. There is also, in each boiler room and in engine room, a hose connection for Foamite, independent of distribution system under floor. Portable hand fire extinguishers are fitted as required in addition to the above system.

Lagging

The decks over engine and boiler rooms, auxiliary machinery room, engine and boiler casings have been fitted with insulation, which also extends part way down the longitudinal and transverse bulkheads in these spaces.

The piping systems, including valves, fittings, etc., are covered with improved Rockwool insulating material, magnesia, or hair felt according to the service and temperature.

Electrical Installation

Electrical power is supplied from four 500-kilowatt 3-wire Westinghouse generators, each driven by a Westinghouse steam turbine. These generators supply 240 volts direct-current for all motor-driven pumps, cargo deck winches, main and auxiliary steering gear, windlass, capstans, forced draft blowers, ventilation sets, refrigerating equipment, air conditioning equipment, air compressors, boat davits, searchlights, watertight doors, galley equipment, and motor generators. Through the use of compensators (balance coils), 120 volts direct-current is supplied for lighting.

For use in emergency, in the event of failure of the 500-kilowatt turbo-generators, one 75-kilowatt 3-wire generator driven by a diesel engine is installed. This generator supplies 240 volts direct current for the emergency bilge pump, water-tight doors, and windlass. Through the use of a compensator (balance coil) 120 volts direct-current is supplied for emergency lighting throughout the vessel, flood lights for lifeboat launching, and for navigating lights and equipment. To provide current for instant use in the event of failure of the 500-kilowatt turbo-generating sets and during the time required for starting up the 75-kilowatt diesel generator, a 240-volt emergency storage battery is installed of the Exide Ironclad type M.V.A. 33 with capacity to deliver 200 amperes continuously for two hours.

Turbo-Generators

The generators are designed for 40 degrees Centigrade temperature rise at full load and 53 degrees Centigrade temperature rise at 125 per cent. load for two hours, and approximately 25 per cent. unbalanced current.

The turbine is of the combined impulse and reaction type, operating at 6000 revolutions per minute and is connected to the generator operating at 1200 revolutions per minute through a reduction gear. The turbine is designed to develop its specified load under 390 pounds gauge, with total steam temperature 600 degrees Fahrenheit at throttle and 28½ inches vacuum in the turbine exhaust, and is capable of withstanding full boiler pressure of 400 pounds gauge and 650 degrees Fahrenheit total temperature. The speed of the turbine is controlled by an oil governor. An external oil cooler of ample capacity is mounted on the bedplate.

The diesel engine driven generating set consists of

a 115-horsepower 720 revolutions per minute Model VDH-6, Superior Otto marine type, airless injection, diesel engine mounted on a common base with, and direct-connected to, a 75-kilowatt, 240 120 volt direct current, 3-wire Westinghouse generator designed for 40 degrees Centigrade temperature rise at full load and furnished with compensator coil for 10 per cent. unbalanced current.

The main switchboard is 31 feet 3 inches in length and is made up of 13 panels, arranged from left to right in the following order: Lighting distribution panel A; lighting distribution panel B; shore connection panel C; generator panel D; generator panel E; generator panel F; generator panel G; power distribution panel H; power distribution panel I; power distribution panel J; power distribution panel K; power distribution panel L; and power distribution panel M.

There are a total of nine auxiliary switchboards located throughout the ship for the supply of current to the lighting and power panels. These boards are of the same general construction as the main switchboard. There are twenty-nine power panels and eighty-five lighting panels installed in locations best suited for convenient operation by the ship's personnel. The main and auxiliary switchboards, power and lighting panels control the distribution of current for a total connected load of 3846 kilowatts, the connected power load being 3250 kilowatts and the connected lighting load 596 kilowatts.

For control of the 75-kilowatt emergency diesel generating set, cutting in and out of circuit of the emergency storage battery, and distribution of current to the emergency lighting system, flood lights for lifeboat launching, emergency bilge pump, watertight doors, wireless, navigating lights, and equipment, an emergency switchboard is installed in the emergency diesel generator room on C deck. The emergency storage battery is installed in an adjacent compartment.

This emergency switchboard is normally fed from the main distribution switchboard but upon failure of this supply the emergency storage battery is automatically switched on the line for supplying current to the emergency lights and radio until emergency diesel generator takes hold when the battery is automatically cut out.

Switchboards and panels were all designed and built by New York Shipbuilding Company, using General Electric circuit breakers, Weston meters, and Pringle switches.

Supply for the various 115-volt interior communication systems is from the emergency bus. For ship's telephone system, current is supplied by a group of Exide Type MVA-7, storage batteries with a capacity of 103 ampere hours at the 8-hour rate. Call bell system current is supplied by Exide Type MVA-13 storage batteries with a capacity of 206 ampere hours at the 8-hour rate. Electric clock system current is supplied by a group of Exide Type LXRH-9 storage batteries with a capacity of 67 ampere hours at the 8-hour rate. Fire alarm system current is supplied by a group of Exide Type MVA-11 storage batteries with capacity of 171 ampere hours at the 8-hour rate. The two radio-equipped motor lifeboats are each supplied with Exide MVA-25 storage batteries with a capacity of 412 ampere hours at the 8-hour rate.

There are 9179 lighting fixtures containing a total of 8387 lamps, varying in size from 5 watts to 500 watts. Twenty-four 500 watt floodlights have been provided for illuminating the side of the ship when launching lifeboats.

There is a total of 252 motors ranging from 1/8 horsepower to 115 horsepower, the aggregate of which is 3564 horsepower. Open type control equipment has been used wherever possible assembled on special panels to form group control switchboards at the various

electric stations. All control equipment is semi-automatic with remote control push-buttons at the motor. On all vital auxiliaries in the machinery spaces indicator lights have been provided to indicate the operation of the auxiliary.

Interior Communication

The following additional systems of interior communication are installed: An air-lock indicator system is designed to give visible (lamp) and audible (bell) signals on one side of air lock when the other side of the air lock is open; a fuel oil signal system of alarm bells and push buttons for signalling between the several fuel oil manifolds, filling stations and the fuel oil transfer pump; a refrigerating alarm system installed to give an alarm and indicate on an annunciator in the galley, if any of the refrigerating attendants are accidentally locked in any of the refrigerating compartments; a pyrometer system installed to indicate the temperature of the waste gasses passing up the stacks; an electrical salinity indicator system of the ammeter type for indicating the degree of concentration of salts in the boiler feed water; a complete and extensive call-bell system for stewards and stewardesses; and a complete central station lamp type telephone system for cabin class quarters, using standard American Telephone and Telegraph Company equipment including a 320-line single-position switchboard with desk type monophones in the staterooms provision for shore connections.

Navigation and Emergency Equipment

Very complete and up-to-date is Manhattan's navigation equipment. The magnetic compass installation, all of Negus navy standard type, includes: a standard compass atop the wheel house for trick wheel steering at that station; a spirit compass in the wheel house; and a binnacle on the docking bridge.

Included in the Sperry gyroscopic compass system are a master compass with motor generators and control panel located on E deck amidships; a repeater on top of wheel house; two repeaters in wheel house (one on gyro-pilot and one at radio direction finder); one repeater in captain's office; one on pelorus (port wing of bridge); and one on docking bridge.

A Sperry gyro-pilot of the double unit type is installed with the steering unit in the wheel house and the control unit in steering gear room. This unit is arranged for either automatic steering under the control of the gyro-compass, manual control of the electric steering, or manual alteration of the course while under automatic steering.

Sperry supplied also a course recorder, a rudder angle indicator system, a rudder angle recording system, a propeller shaft revolution indicator and comparator system.

A Kolster radio compass or direction finder insures correct bearings in fog navigation, and a Fathometer gives still further assurance by instantaneous correct soundings. Two electrically operated sounding machines were supplied by Louis Weule of San Francisco.

The Cory electric telegraph systems for engine orders, docking instructions, and steering directions are of the latest alternating current type. A fire room order telegraph system of the same type is installed for en-

gine room-fire room order communication. An auxiliary mechanical engine order telegraph system is in-



The spacious enclosed navigating bridge of T.S. Manhattan is equipped with the best and most modern devices for safe navigation and for the control of maneuvering and of the various emergency devices that are installed for ship safety. Windows are Kearfoot.

installed in the wheel house.

Two Cory-Kent window-type, clear view screens are mounted in the wheel house to insure the navigating officer a transparent windshield.

The Mackay Radio wireless equipment is capable of holding uninterrupted direct day or night communication with both sides of the Atlantic at any time during the round voyage. The two motor lifeboats are equipped with radio transmitting and receiving apparatus operating with a storage battery and having a 50-mile range day or night.

Two Henschel loud speaking navigation telephone systems are installed—one for communication between the pilot house, chief engineer's room, engine room, steering gear room, and docking bridge; the other for communication between the pilot house, the crow's nest, and the forecastle.

Four Sperry searchlights are installed, two 18-inch lights of 30,000,000 beam candle power high intensity for ranges up to 3 miles; and two 18-inch lights of 1,500,000 beam candle power incandescent for short range and for flood lighting large nearby areas.

Life Saving Appliances

The Manhattan is fully equipped with life saving appliances as required by the United States Steamboat Inspection Rules for a full passenger and crew list. Buoyant apparatus to the extent of 25 per cent. of the vessel's total complement is also provided and consists of 21 4-foot by 6-foot floats for 20 persons each, which were furnished by the Welin Davit and Boat Corporation. These floats are stowed on sun, A, and B decks and can accommodate a total of 420 persons. The Atlantic-Pacific Manufacturing Company supplied: 1700 solid cork life preservers, adult size; 167 solid cork life preservers, children's size; 12 solid cork life ring buoys complete with handlines and self-igniting water lights; and 12 solid cork life ring buoys with hand lines.

Boats and Davits

There are sixteen boats in their davits at the level of the sun deck, two at the after end of the promenade deck, and four boats nested at the after end of A deck. All boats and the gravity davits were supplied by the Welin Davit and Boat Corporation. Sixteen of the lifeboats, with a capacity of 84 persons each and dimensions of 30 feet by 10 feet 6 inches by 4 feet 6 inches, are of round bottom type constructed of copper bearing steel, the plating being 20 per cent. over the requirements of the United States Steamboat Inspection Service. The keel, stem, and stern-posts are of steel and the boats are fully equipped for ocean service with buoyancy tanks, all the necessary equipment, and are fitted with Mills releasing gear. The four lifeboats aft are identical with those above except that they are built so as to be stowed in tiers of two boats each, the upper boat being carried on cast steel pedestals.

The two motor lifeboats of wood are 30 feet by 8 feet 8 inches, of 424 cubic feet capacity, and carved built with square stern fitted with Mills releasing gear. The motor, a 4-cycle gasoline type with starter and reverse gear, has sufficient power to develop a speed of 8 miles per hour when fully equipped and loaded with passengers. Fuel capacity guarantees a cruising radius of 200 miles in ordinary weather. Each motor boat has a self-bailing cockpit, a small trunked cabin for housing the motor and the radio sending and receiving sets, bitts for towing and hinged masts for radio antenna. The boats, with the exception of those aft on A deck are carried on davits of the Welin-MacLachlan gravity type, complete with channel trackways, steel travellers, all necessary rollers and sheaves for falls,

and the fittings to take gripe gear. Double coupled and single boat hoisting electrical winches serve these davits. A 13½-horsepower, 230-volt direct current Westinghouse, sleeve bearing, series wound, 15 minute rated, reversible motor, complete with limit switches, reversible controller, isolating switch, and resistors mounted in watertight cases, operates each double coupled winch and will hoist an empty 30 foot, 84 person life boat up the ship's side at a speed of about 14 feet per minute. For the single winches handling the motor boats, the hoisting equipment is similar but is equipped with a 20-horsepower motor. The lifeboats in tiers on A deck aft are handled by Steward mechanical davits. The falls are led to a winch with worm gear, driven by a motor of 10 horsepower capable of hoisting the empty boat through 4 part falls at the rate of 14 feet per minute.

Fire Protection

Rich Smoke Detecting Apparatus, supplied by Walter Kidde & Company, has been installed in cargo holds, dry stores, refrigerated cargo, passenger baggage rooms, mail rooms, linen storage room, boatswain's store, lamp room, and paint room. This installation consists of a smoke detecting cabinet located in the pilot house and a duplicate exhaust fan equipment on top of the pilot house. The smoke collectors fitted on the pipe terminals in the various spaces are so constructed that they will not be damaged by cargo.

The fire extinguishing apparatus consists of a steam smothering system controlled through manifolds for the cargo holds, dry stores, refrigerated cargo, baggage rooms, mail rooms, and linen storage rooms, and a Lux System of carbon-dioxide gas for boatswain's store, lamp room, and paint room. The carbon-dioxide is released from a battery of seven cylinders located in the carpenter's shop forward on C deck. Manifolds with distribution valves enables the gas to be discharged into any compartment affected.

For the protection of passenger and crew quarters, storerooms, lockers, etc., a 40 zone Henschel Mercurial Thermostat type fire alarm system, as required by the United States Steamboat Inspection Service, has been installed. Each system consists of annunciators, manual fire alarm boxes, mercurial thermostats, fire alarm gong, with duplicate storage batteries for the supply of power. These thermostats give an alarm in the wheel house when the temperature of any space reaches a certain predetermined limit and also locate the source of the alarm. In suitable locations, portable hand extinguishers, supplied by the Buffalo Fire Appliance Corporation, are installed and consist of eight 2½-gallon soda acid type, and twenty one quart Niagara carbon tetrachloride type, by which small local fires may be controlled.

A foam fire extinguishing system, manufactured by the American LaFrance & Foamite Industries, is installed, and hose stations are located in each fuel oil filling room, in each fireroom, and one in forward end of engine room. The apparatus consists of two Foamite generators with 6650 pounds of Foamite generator powder, and the necessary hose reels, nozzles, and distributors.

In addition to the foregoing, a fire main, carrying water under pressure, is fitted throughout the ship with hydrants and hose reels installed which permit all parts of the ship to be reached with a short length of hose. To localize fire in the passenger quarters, steel fire bulkheads extending across the ship and faced with Tucowul each side, are fitted about 90 feet apart. Every possible effort has been made to bring all fire hazards to a minimum.

Passenger Spaces and Interior Decoration

In planning the arrangement of passenger spaces and the decoration thereof the designers and owners of the turbine steamship *Manhattan* set as an ideal the utmost of comfort and convenience combined with a scheme of decoration that would exemplify the finest craftsmanship and the highest degree of artistry to be found in America. The Walter M. Ballard Company, to whom the responsibility for interior design was entrusted, has maintained this ideal to a very remarkable degree. This seagoing hotel had to be subdivided, furnished, equipped, and decorated to take care of all the necessities and the desires of 573 cabin class passengers, 461 tourist passengers, 196 third class passengers, and crew for the seven-day crossing. In the finished result several features stand out as unique in ship interiors. Perhaps the most appealing of these unusual features is the huge fire place for wood fires in the smoking room. As shown in our illustration, this is of great size and is arranged to take a large back-log and a real fire. Another innovation is the arrangement by which the curtain and screen of the stage in the grand lounge slide up into the ceiling. T.S.S. *Manhattan* is the first ship to have upper berths that disappear into the ceiling of the bedroom and can be brought down again for use by two simple motions.

The most prominent feature of the interior decoration scheme is the very lavish use of rare hardwood veneer faces and moldings on the Haskellite panels used to line the foyers, public rooms, and staterooms. Other delightful features are the profuse use of beautiful hand wrought metal work from the shops of Oscar Bach that is incorporated into the decorative scheme of nearly every room and the many lovely mural paintings and decorations from the brush of Aldo Lazzarini that adorn the walls and ceilings of the grand lounge, the palm court, the children's playroom, the smoking room, and the Venetian veranda cafe.

The general arrangement and location of the passenger accommodation spaces have already been described. Entering the ship as a cabin class passenger,

we find ourselves in a fine entrance lobby on the C deck level. This lobby is finished in *prima vera* (white mahogany) with borders of walnut and satinwood. Two service counters with hand wrought metal grilles mark the offices of chief purser and chief steward. A number of recessed shops with counters of an attractive design are provided for cigars, toilet articles, books, perfume, and souvenirs. On the after bulkhead of this lobby are arranged the elevator entrances and stairways surrounding the two elevator shafts. These stairs exhibit a very fine bit of decorative hand wrought metal work in the dolphin newel posts by Oscar Bach. These are in iron overlaid with antique gold. This bulkhead carries also the doors to the cabin class dining saloon.

Dining Saloon

The cabin dining saloon, in which the cream and gold elegance of the Court of Louis XVI is reincarnated, seems to echo bright talk and responsive laughter, to promise good food and good drinks. It is a room in which it is impossible to imagine a somber meal. It seats 396 persons. Its generous dimensions of 82 by 90 feet and a two story central section have afforded ample space for the creation of a truly regal room. Beautifully proportioned wall paneling in cream and ivory tones, with a faint suggestion of pastel color are ornamented in gold and form a lovely background for the rich color that has been introduced in decorative details, furniture, and drapery and in hand-painted strips of canvas in French renaissance style applied to the beam soffits.

Attention is focused on the magnificent murals by Lazzarini that decorate the ceiling and wall spaces in the large central well by dramatic indirect lighting of the paintings from a series of coves below them.

The dominant mural occupies the dome and is a life size group representing Paris as a young shepherd presenting the golden apple to Aphrodite in the presence of the disappointed goddesses Hera and Athena. Four cherubs representing poetry, music, drama, and



Beautifully proportioned, this regal dining room, 82 by 90 feet, seats 396 persons. The color scheme is cream and gold, with a faint suggestion of pastel coloring. The drapes are in turquoise and silver, and the upholstery of the chairs is a heavy brocade in dull coppery rose color. Prominent in the decoration are a number of beautiful mural paintings by Aldo Lazzarini, the exquisitely hand-wrought iron railing on the musician's balcony, and the grilles over the ventilation openings.

sculpture complete the ornamentation of the well ceiling. The forward wall of the well is occupied by a musicians' gallery surrounded by hand wrought iron railing of great delicacy and beauty by Oscar Bach, bearing ornamental medallions picked out in vitreous enamel in rich colors.

Hangings of especially designed brocade in turquoise and silver close off the balcony at the back.

The other walls of the well bear three exquisite and arresting murals in the colorful style of Boucher, the great French painter of the period, symbolic of the feast: a Bacchanal, Diana and her nymphs hunting, and a scene on Lake Neme which was associated with the worship of Diana. Ivory vases set at intervals around the well opening are filled with trailing vines that accent the cream background.

The turquoise and silver brocade of the balcony has also been used for draping the windows and falls from a festooned valance. A space between the honey colored glass of the windows and the porthole has concealed lights which give the effect of sunlight pouring through the glass.

Graceful chairs painted a deep cream color are covered with heavy brocade in a dull coppery rose color that complements the blue of the draperies.

Sidelights on the supporting columns and on the wall are in the form of French hunting horns and supplement the indirect cove lighting of the dome and ceiling.

Exquisite hand wrought grilles by Bach conceal the openings that are part of the air conditioning system and add to the beauty of the room.

The table linen and table equipment for this room is exceptionally beautiful. For instance, the one item of silverware is all of special design in a sea shell pattern and includes 28 892 pieces.

Palm Court

Going forward again to the entrance foyer, we take the elevator to the promenade deck to inspect the group of cabin class public rooms on that level. These rooms are surrounded by the wide, partly open, partly glass-enclosed deck promenade space, six laps to the mile and with one unobstructed area 50 feet square.

At the forward end of the superstructure on the promenade deck is the Palm Court with large lobbies between it and the grand lounge. The elevators and grand stairway open directly into the Palm Court.

The delicate beauty of the Palm Court baffles description. The entire wall covering is the work of Aldo Lazzarini who also painted the 36 Chinese panels that form the major descriptive motif. Painted on dully gleaming silver and gold canvas these panels are executed in extremely delicate lacquer colors and depict, with the amazing economy of line characteristic of Chinese art, enchanting scenes done with a delicately humorous touch. The panels are framed in gold moldings and over each is a gallery light of frosted glass with a small Chinese motif in lacquer red.

The surrounding walls are formed of alternating strips of silver and gold canvas over which Chinese floral designs wander.

The square supporting columns have the same silver and gold canvas, painted in authentic Chinese floral designs overlaid with a graceful fretwork of lacquer red.

The furniture is Chinese Chippendale, a French adaptation of the Chippendale style with the Chinese fretwork motif. The same soft colorings are repeated in the decorations of the beam motifs, while the spaces between are done in geometric bandings of the flat colors. The flat ceiling lights are in frosted glass in rectangular or octagonal shapes.

In a recess formed by mirrored partitions with blue draperies painted under the glass stands a specially designed Steinway grand piano, its lines and painted decoration adhering to the Chinese design of the room. Artistic skill is shown in the adaptation of the Chinese fretwork motif to the formal, 18th Century chairs, settees and tables, some in painted woods, others in ebony mahogany. Jewel tones appear in the fine silk brocade covering the easy chairs, the lattice design is brought out on a pale rose background in the upholstery of the graceful settees, and fine hand embroidery in gold thread on black damask is used for the backs of the straight chairs. Large rugs in Chinese blue and gold cover the floors, and the low coffee tables with



One of the most exquisite public rooms on the Manhattan is the Palm Court, decorated by Lazzarini in the Chinese in delicate colors on a background of silver and gold. An interesting feature of this room and one which, we believe, is here used for the first time is the employment of full length French casement windows which can be opened outwards so as to practically include in the room a large portion of the enclosed promenade deck. There are nine of these windows, three starboard, three port, and three forward.

their square lines and Chinoise embellishment carry out the decorative scheme. Every detail contributes to an atmosphere of light and gaiety that is irresistible.

Grand Salon

Dignity and spacious grandeur are the outstanding characteristics of the main salon two decks in height and with a large, shallow central dome. Its Georgian style, reflecting graceful yet substantial elegance, was considered particularly appropriate for the formal social life of the ship, which will center here.

The bayed window recesses on either side give added floor space and, with their pillared entrances, provide opportunity for an intimate grouping of sofas and lounge chairs. Between the windows and doorways are pilasters of walnut, their long fluted lines lending still further height and dignity. Panelings of beautifully marked walnut are fitted into the intervening wall space, their carved moldings relieved with touches of antique gold.

At the forward end of the room is the musician's platform, the frame of the proscenium arch richly carved and having the characteristic elaborate central motif, after the manner of Grinling Gibbons. The central ornamentation of the room is the fine mural painting by Lazzarini which covers the shallow oval dome. Against the deep tender blue of the heavens gleam the constellations of the stars. Around the astronomical compass, which is outlined against a central radiance are the artist's conception of the twelve signs of the Zodiac as if revolving in an orbit. Cove lights emphasize the importance of the painting and serve as a source of general illumination. Imaginative power, feeling for color, and superb technique are shown in the window lunettes, symbolizing the four elements Air, Earth, Fire, and Water.

The ceiling panels are set off by moldings of leaf and wreath design, the flat portions bordered in soft rose and blue colorings. Finely wrought iron grilles by Oscar Bach conceal the ceiling ventilators and hold a lighting fixture. At the after end is a concealed altar for which Lazzarini has painted an appropriate ecclesiastical background. When not in use this appears simply as one of the paneled spaces. Above this is the projection room for motion pictures. The sound equipment, of the Western Electric type, is fastened to the back of the screen on the stage at the opposite end of the room. This screen, when not in use, can be raised like a theatre curtain and carries the equipment with it into a special compartment between decks.

Warmth and intimacy are given by the rich fabrics of draperies and upholstery, by the deep piled rugs, the chairs, sofas and tables designed to carry out the Georgian character of the architectural design. The four full length windows have handsome valances bordered in gold braid in characteristic period style from which hang draperies of heavy damask in subdued claret red. The same damask is used at the casement windows in the recesses. The arrangement of each chair, sofa and table extends an invitation for informal groupings and individual relaxation. Each piece of furniture has been especially designed for this room, the style being admirably chosen to provide luxurious ease, without any hint of the massive. Innumerable tables, in Queen Anne, William and Mary or purely Georgian style, are placed at convenient points. An exquisitely modeled fernery of burl walnut, richly carved and inlaid decorates the foot of the stage. Graceful consoles appear in the entrance recesses surmounted by mirrors in carved frames. Chairs and sofas are covered in a vari-



The entire area of the grand salon is two decks in height, giving great dignity and spacious grandeur to this apartment. Rich fabrics in drapery and upholstery, deep piled rugs, and a variety of rich furnishings carry out the Georgian period motif of the architectural design. Windows are Kearfott.

ety of tapestries, damasks, brocatelles, and antique velvet, in harmoniously blended shades of rose, mulberry, blue, and green. With all this wealth of gorgeous detail, the effect is one of tranquil ease and satisfying beauty.

Library and Writing Room

Proceeding aft on the starboard side of the ship we come next to the library. This room has a quietly luxurious, restful atmosphere, appropriate to the use for which it was planned. Carrying out the Elizabethan-Tudor period, the walls are paneled from floor to ceiling in old English oak in square sections. A molded ceiling has the characteristic Tudor design. The deep recess in the center of the room holds a bookcase with a carved valance of walnut. Draperies at the small paned casement windows are of Fortuny brocade in faded rose against a pale, dull gold background. Two small sofas with carved walnut frames are upholstered in sage green antique velvet, while a larger one is finished in multi-colored tapestry. Garnet colored antique velvet is used on the lounge chairs, and the large table extending down the center of the room is ornately carved in the Elizabethan style. A deep piled carpet, carrying out the rich colors of the upholstery in darker tones, completes this restful and harmonious reading room.

On the port side, in the same position, is the writing room. In distinct contrast to its companion room, this is a modern adaptation of the 18th Century Hepplewhite style. Matched panels of pale satinwood and walnut with inlays of burl and exotic woods face the walls. The writing tables and chairs follow the straight, yet graceful lines of the period. In the recess, which corresponds to the one in the library, are four desks with individual lights.

Vestibule lobbies, port and starboard immediately aft of these two rooms, separate them from smoking room and give entrance to or from the deck promenade.

Smoking Room

In the cabin class smoking lounge the motif for the interior decorative treatment is the life and art of the American Indian. The center of interest here is the series of four spirited paintings of Indian life by Lazzarini, who made an exhaustive study of the primitive American and has worked with great understanding.

(Please turn to Page 349)



Photo by Ralph B. Bell, Oakland, Cal.
Broadside view of 24-inch suction dredge Marshall C. Harris, with ladder extended.

A Floating Industrial Plant

*24-inch Suction Dredge Marshall C. Harris, Pacific Coast's Most Powerful Dredge
Taking Shore Power, Delivered to American Dredging Company
of Oakland and San Francisco*

THE American Dredging Company, pioneer in the use of suction dredges and for many years leader in the notable achievements of harbor and terminal improvement in the San Francisco Bay area and throughout the Pacific Coast, has recently taken delivery of a supersuction dredge from the Golden State and Miners Iron Works of San Francisco. Since these two firms have collaborated on the majority of practical improvements in Pacific Coast dredging practice during the past two generations, the description and illustration of this new dredge should be of great interest to engineers in general and to marine engineers and shipowners in particular as being the most powerful tool yet produced for keeping existing harbor channels clear and for opening channels and basins for new harbors.

This dredge, christened the Marshall C. Harris, after the president of the American Dredging Company, is

claimed to be the largest suction dredge in the world using shore power and to be the most powerful dredge of any type. The construction throughout is heavier than any dredge heretofore built, and much of the equipment is here used on a dredge for the first time.

Dredge Marshall C. Harris was built to the plans and specifications of the Golden State and Miners Iron Works' engineers and designers, who also built and installed the mechanical equipment and machinery. The structural steel was fabricated and furnished by the Pacific Coast Engineering Company of Oakland. The hull was built and the structural steel was erected by the General Engineering & Drydock Company of Oakland. Steel castings were furnished by the General Metals Company of San Francisco. Electrical installation was made by Pacific Electric Motors Company of Oakland. Many firms supplied various items of equipment as listed hereinafter. All work and all equip-



Left to right, Mrs. N. R. Harris, wife of the founder of the American Dredging Company and mother of its present president, ready to christen the new dredge; Raleigh N. Harris, secretary and general manager, Russell Harris, operating manager, and Marshall C. Harris, president, of the American Dredging Company.

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ment were done under the supervision of the general contractors, the Golden State and Miners Iron Works, and under the personal inspection of Marshall C. Harris.

Fifty dredges of the clam-shell and the suction type have now been successfully completed by the Golden State and Miners Iron Works for harbor and river control and conservancy work in many parts of the Pacific Ocean shore line, including Asia and South America.

The general dimensions of the dredge Marshall C. Harris are:

Length of hull	150 feet
Width of hull	45 feet
Depth of hull	12 feet
Length of ladder	90 feet
Maximum depth of cut	60 feet
Capacity of dredge pump	1500 cubic yards per hour

Special care was taken in the design and construction of the hull to produce a structure that would stand up well under the severe usage of dredging operations and that would function with the least maintenance expense. As designed, the strength members of the hull are of heavy structural steel fabricated into two large trusses, running fore and aft for the full length of the dredge, 12 feet 6 inches to port and starboard of the center line. These trusses are 25 feet high and are connected transversely by cross trusses and by heavy I-beams closely spaced in way of the machinery foundations. This frame is attached to and floated by a heavy wooden hull.

Timbers for this hull were cut from Oregon pine trees specially selected for their dense grain. These heavy timbers are bolted together with Kortick Manufacturing Co. special bolts (the holes being bored for a heavy drive fit) and are waterproofed on the outside with a heavy coating of Stockholm tar and sheathed with waterproof paper covered by 2-inch tongue and groove redwood planking. California redwood is highly obnoxious to the teredo and is also rot-resistant under wet or alternately wet and dry conditions. The long experience of the American Dredging Company with dredge hulls in California rivers and harbors has indi-

cated that this type of hull construction is the best for maintenance economy. It is interesting as a side-light that the Marshall C. Harris has 26 tons of salt packed



Above, two views of the 20-inch suction dredge Marshall C. Harris. Upper view shows the huge steel spuds and the spud frame. Each spud, with its point, weighs 35 tons. Lower view shows the ladder and the cutter, the A-frame, and the arrangements for raising and lowering the ladder.

At the left is a view in the hold of the Marshall C. Harris showing the four Warren service pumps operated by two 60-horse-power motors. Note the massive construction of the wood frame of the hull.



General Engineering & Dry Dock Co.

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BUILDERS OF THE HULL



THE PACIFIC'S LARGEST SHORE-POWERED DREDGE

"MARSHALL C. HARRIS" BUILDERS REPAIRERS STEEL WOOD

The Facilities, Craftsmanship and Experience of
Two Leading Pacific Coast Organizations...at
the Service of Shipowners and Operators

Los Angeles Shipbuilding & Dry Dock Co.

San Pedro, California



Two of the heavy steel castings supplied by the General Metals Company for the dredge. Upper shows spud point cast at the Best Steel Company and lower view shows nose casting for the ladder cast at the Columbia Steel Company.

into her bilges to pickle the timber. Timber for the hull was supplied by the Loop Lumber Company.

The cutter and suction pipe ladder is 90 feet long and weighs, with its appendages, approximately 140 tons. Its main members are fabricated from the heaviest I-beams manufactured to day, 36 inches high and 300 pounds to the foot. The forward end of this ladder terminates in a nose casting of steel which weighed 10½ tons as cast at the Columbia Steel Company for the General Metals Company. The after end of the ladder is hinged to the hull through massive cast steel hinges also cast at the Columbia Steel Company plant. The outer end of the ladder is supported from a heavy steel construction A-frame which is held in position by four 2½-inch diameter steel cables made fast to the jack frame, which is part of the main truss construction and rises 35 feet above the top of the longitudinal hull truss.

The spuds are heavy steel tubes, 36 inches outside diameter, 2 inches thick, and 70 feet long. These tubes terminate in a heavy cast steel point, each tube and point weighing about 32 tons. The point casting is turned down to a press fit in the tube and the tube pressed against the shoulders on the casting is pinned in place and then are welded. These spuds are carried in cast steel guides securely fastened to the trusses of the dredge hull.

In the steel construction, as in the wooden hull, great care was exercised to produce a completed structure that would enjoy very low maintenance costs. The trusses, jack frames, A-frames, ladder, spuds, and all exposed metals are given a thorough priming coat of Fishoilene and on the exterior a finish of Aluminum. On the roof of the superstructure the top of pilot house and the hatch covers Robertson's Duplex Steel Decking is used covered with two layers of fiber insulating material and a 3-ply asbestos felt mopped on with hot

asphalt. The side walls are of 20 gauge Robertson protected metal, flat siding. This is medium open hearth sheet steel with a special coating on both sides of hot asphalt into which is pressed a layer of asbestos felt which is bound around the edges and completely prevents the steel from being exposed to corrosive action. This siding lasts indefinitely and makes a very neat job.

All windows and swinging doors are of steel, were furnished by the Detroit Steel Products Company and were glazed by W. P. Fuller & Company. Vertical sliding doors of the Mahon Roller Shutter type are extensively used and were furnished by the Rolph, Mills & Company. All paint work on the hull structure was performed by the Dunne Paint Company of Oakland. Ducoite nonbilging white is extensively used in the interiors.

Electrical Equipment

The electrical equipment of the Marshall C. Harris has many features quite different from the usual dredge application, which will result in unusually economical operation and high over-all power, factors which are naturally of primary importance.

Electric power is brought on the dredge through armoured shore cable at 11,000 volts into a General-Electric Company outdoor switchhouse on the dredge. The switch house contains the main oil circuit breaker, watt hour meter, maximum demand meter, and other devices.

Three Gardner transformers are used to transform the 11,000 volts supplied by the power company to 2200 volts used on the majority of the equipment. These are self-cooled, of 1400 KVA each, 10 feet 4 inches in height by 11 feet extreme width, and made by the Gardner Electric Manufacturing Company of Emeryville, California. Each transformer contains 1000 gallons of Associated transformer oil which when circulating through the high efficiency radiators made in the Gardner plant provides more than usual cooling and allows considerable overload with complete safety. These transformers are provided also with water cooling coils which may be used at any time if additional capacity is required.

Power from the transformers is taken to the switchboard where it is distributed to the larger motors at 2200 volts and to the smaller auxiliary motors at 440 volts from a bank of three General-Electric transformers 75 KVA each, 2200 to 440 volts.

Since the main pump will utilize about 75 per cent. of the total power, it is evident that the performance of the dredge as a whole largely hinges on the main drive. The requirements include operation at a constant torque over a speed range of from 400 to 280 revolutions per minute with operation about 50 per cent. of the time at approximately 355 revolutions per minute. This speed range is necessary to compensate for changes in head due to changes in length of discharge pipe line so as to obtain a substantially constant rate of flow in the line and to avoid over-loads and unnecessarily high output when only a short pipe line is required.

With the usual resistor control of a variable speed wound rotor induction motor drive, considerable power is lost at the resistor at low speed operation or else considerable time is lost while changing pump runners to permit the motor to run at normal speed.

After careful consideration of the various possibilities and the special requirements for suction dredgers of this type, a constant-torque couple-range Scherbius equipment was selected for the main pump drive. The

American Wire Rope makes 294,000 lb. lift



Lifting 147-ton dredge ladder on San Francisco's Embarcadero for transportation across the bay to American Dredging Co.'s yard on Oakland Estuary.

HAVISIDE derrick barges, No. 3, No. 4 and No. 5, with 147-ton ladder of the "Marshall C. Harris" lifted, ready to proceed to middle of slip, where the load was placed on a floating drydock. Haviside No. 4 took two-thirds of the load; No. 5 took one-third, while the light, handy, long boom barge No. 3 steadied the lift. The lift was made with ease and safety, and American Steel & Wire Company's wire rope, standard rigging of the Haviside derrick barge fleet, advanced to another achievement in special heavy weight-lifting.

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equipment is rated 2800-2500-1950 horsepower; 400-300-220 revolutions per minute, with provision for an increase of approximately 20 per cent in capacity at some future time.

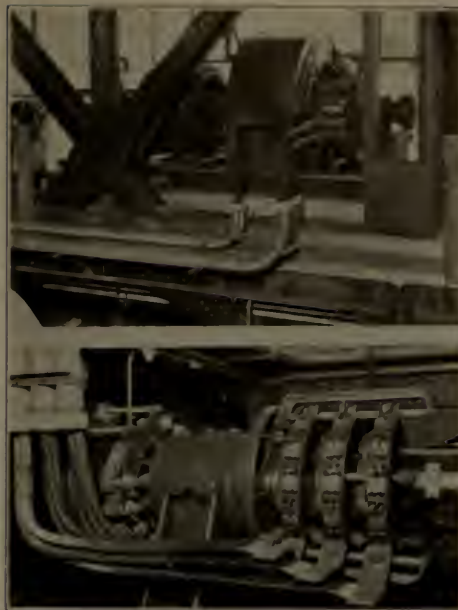
This is believed to be the first speed regulating set of this general type for dredge service. The set includes a 2500-horsepower, 260 revolutions per minute, variable speed, slip ring type, motor with an Ohmic lamp exciter and a speed regulating set driven by a 225 horsepower, 0.8 power factor, synchronous motor, together with field control transformer, bulging transformer, and complete control equipment. This synchronous motor and synchronous motor generator set will tend to cut down the power losses and improve the power factor as compared with the usual adjustable speed, wound rotor, motor drive with secondary resistor control.

Provision is made in the control for shutting down the speed regulating equipment and operating the main motor at about 355 revolutions per minute as a straight induction motor drive with the rings short circuited, thus making for more economical operation at this speed.

It is expected that high power factor and efficiency will be secured with the equipment selected, the choice of which depends on a number of factors including speed range, required method of operation, and whether constant torque or constant horsepower output over this range is desired.

The cutter motor is a General Electric, two-speed, squirrel cage type, rated 750-375 horsepower; 720-360 revolutions per minute, 2200 volts, and will operate the cutter through two sets of speed reduction gear. A Fabco Type R, flexible coupling is installed on each side of the first set of gears which reduce the speed from 750 to 90 revolutions a minute. The 9-inch shaft from the slow speed side of this gear set runs from the Fabco coupling through two bearings to a Cutler-Hammer magnetic clutch, then through another bearing to a universal joint of the knuckle type; then a slip joint composed of a square steel shaft sliding in a cast steel housing; then another universal joint to connect with the pinion shaft of the gear set mounted on the inner end of the ladder. This is a Westinghouse-Nuttall single helical gear and pinion and is the largest heat-treated gearing operating on a dredge cutter on the Pacific Coast. This gear has a face of 18 inches, is 98 inches in diameter, and has 94 teeth. Two pinions are provided, each mounted on a shaft fitted with knuckle joint for quick change for two cutting speeds. One of these pinions is of 24 teeth, the other 31 teeth.

The winch for swinging the dredge hull and for



raising the ladder is driven by a 200-horsepower, 230-volt General-Electric direct current, shunt-wound motor operating under Ward-Leonard variable voltage control and taking current from a General-Electric, 300-horsepower, 200-kilowatt motor generator set with an 0.8 power factor synchronous motor.

Mounted on the same bed plate and connected to the motor shaft through a Fabco Type R flexible coupling is a Sterling 300-horsepower at 1200 revolutions per minute gasoline engine. Thus the set may be operated off 2200 alternating current or by the gasoline engine in case of failure of shore current; and in the latter case provision is made for taking 440 volts alternating current off the synchronous motor (now an alternating current generator) for operating pump and machinery motors or powering the lighting transformers. The installation of the gas engine at this point eliminates the necessity for any other stand-by power installation. The common bed plate for this set is of structural steel fabricated by arc welding.

In addition to the machinery already mentioned, there are: a high speed hoist operated by a 100-horsepower motor for raising and lowering the spuds; a jib



One of the interesting features of this dredge is the Scherbius constant torque control for the main pump motor.

Lower illustration on this page shows a close-up of a motor and of its Fabco flexible coupling and, at the right, a general view of the motor shaft for the Scherbius control connections.

The upper view shows a close-up of the Scherbius control connections on the main motor shaft and the synchronous motor generator set operated by this control. Note the neat wiring and the electrically welded conduct supports.

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derrick barge fleet skilfully
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great dredge from the Embarcadero
to a floating drydock for transport
to the American Dredging Co.
yard on the Oakland Estuary.

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lubricated Manila Rope.



Two underdeck views on the Marshall C. Harris showing a neat job of complex wiring and, at the right, a view of the three Gardner main transformers and the General-Electric outside switch house, all as installed by the Pacific Electric Motors Company.

crane operated by a 25 horsepower motor for handling heavy lifts; a heavy electric traveling crane running the full length of the dredge for handling heavy machinery; and a number of electrically operated machine tools.

An interesting feature is the remote control from the pilot house of cutter operation, spud hoist, and ladder winch. Through the medium of compressed air devices manufactured by the Westinghouse Air Brake Company, complete control of the ladder, swing, and spud drums is centralized in the pilot house. The friction clutch for each of these five drums is engaged and released by means of a double-acting air cylinder which is controlled through a four-way operating valve in the pilot house. The force for applying the brakes to these drums is supplied by dead weight at the end of a suitable lever. A single acting air cylinder is used to life this dead weight for releasing or slipping the brake. The control of air pressure to these cylinders is provided by operating valves of the recently developed "self-lapping" type, located in the pilot house. Due to the long distance between the pilot house and the spud drums and the need for unusually fast operation of the spud brakes, a quick-release valve is used in connection with both spud drums so that the air from the spud brake cylinders is exhausted right at the cylinder without passing through the long length of pipe to the operating valve.

In addition to the pneumatic control devices, a Westinghouse Pneumatic Horn is used. This horn, operated by compressed air gives a very clear pleasing tone which can be heard for long distances and is ideally

suited to the use of a signal horn. A type H C. 120-foot capacity Rix vertical water-cooled air compressor, driven by a Westinghouse 25-horsepower motor through a Fabco flexible coupling, is installed to take care of this and other compressed air needs on this dredge.

The 24-inch discharge pipe from the main pump is led from the after end of the hull through a Plummer patent roller bearing swivel elbow and a Plummer ball joint, and the Y is fitted with Plummer ratchet valves. Garlock packing is used in pipe joints. Western Pipe and Steel Company supplied the discharge pipe valve. All pressures and flow of various pumps are indicated on a central board fitted with Bristol gauges. The main

Below, the main switchboard.

At right, the Westinghouse Air Brake Controls in the pilot house and the application of one of these controls on a brake at the winding winch.



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of Steel
Castings
410,000 pounds

**205
TONS**

PRESS
FORGINGS

DROP
FORGINGS

CALIFORNIA
WHEELS

Pacific Coast Engineering Company

Fabrication of

STRUCTURAL STEEL
TRUSSES
FOUNDATIONS
FRAMES

for the

MARSHALL C. HARRIS

Pontoon Pipe » Shore Pipe « "Plummer"
Patent Flexible Ball Joints « » Ratchet
Valves » » » Swivel Discharge Elbow

also furnished for this great dredge

FACTORY AND OFFICE

Foot of West 14th Street

Oakland, Calif.

pump is fitted with a Timken roller bearing on the runner shaft.

The service pumps for the hull are four Warren centrifugals all mounted on a common structural steel bed and driven in pairs by two 60-horsepower Westinghouse motors. The bedplate was welded by the Westinghouse service shop at Oakland.

Forgings used on this job were furnished by The Moore Dry Dock Company. Pacific Brass Company made fifty hard bronze bearings for use on the Marshall C. Harris, the largest of these bearings weighing 804 pounds and the total 6000 pounds.

Waterbury water-resistant, rot-proofed permanently lubricated manila rope is carried on this dredge, furnished by The Havaside Company. A De Laval oil purifier insures clean lubricating oil.

It will be seen from the brief description that the dredge Marshall C. Harris is a well designed and thoroughly built floating industrial machinery plant. Certainly she embodies the most modern, most powerful and most efficient equipment of the type ever produced on the Pacific Coast—and possibly in the world. Her owners and builders are to be congratulated on their courage and forward-looking vision in making so great an investment in the future of the Pacific Coast.

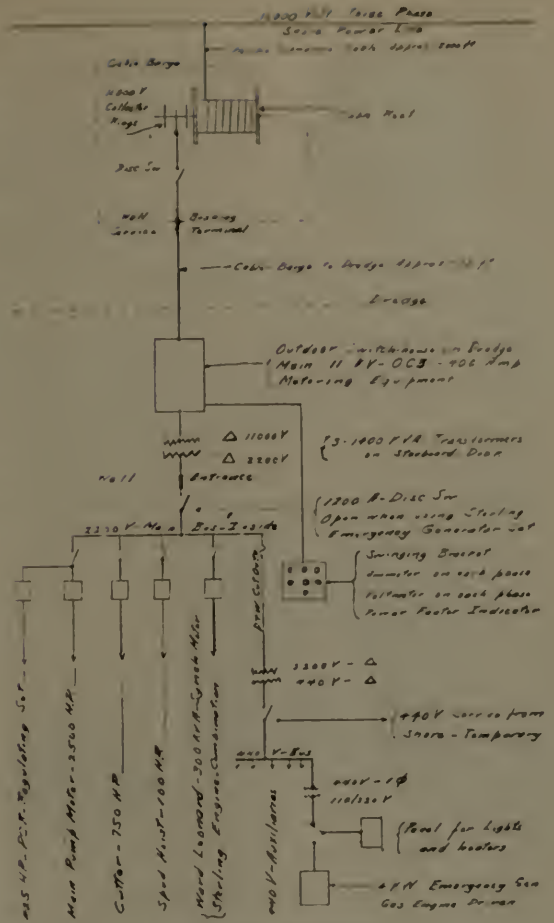
Electrical Installation

A suction dredge is not a self-propelled vessel nor a tug boat, but, primarily, a tool or industrial plant where men are employed doing useful work—keeping open the channels of trade. As such, the safety requirements of a dredge operating in California waters are under the jurisdiction of the Industrial Accident Commission of the State of California, and the electrical installation features are typical of land practice, except with a marine touch.

Being an industrial plant using electrical power from shore, the first step in design of the dredge Marshall C. Harris was the proper selection and application of the equipment, motors, and control for the work to be done. This involved considerable time on the part of the owner and his engineers in considering such electrical factors as speed, variation, starting torque, starting currents, voltage, power factor, and efficiency. Mechanical features, such as bearings, enclosures, size and weight of shafts, also had to be considered. In general, the equipment was selected to be consistent with its surroundings and economical for operation and maintenance. Successful applications are no longer a matter of luck. Electrical equipment will do exactly what it is designed to do and just that.

Electrically, the Marshall C. Harris has a connected load of over 4000 horsepower in operating equipment. She uses alternating current and direct current, three phase and single phase, 5 to 60 cycle, 11,000, 2200, 440, 220, 110, and 22 volts. The design involves all the latest practices in variable voltage (Ward-Leonard) control, Scherbius speed control, individual drive, across the line starting, and magnetic control.

While it is true the installation of these modern features of design is somewhat complicated, there need be no fear if the equipment is simple to operate and gives the desired results at the lowest operating cost. Few people have been more alert electrically than the dredgerman. He has learned to use electrical equipment to maximum capacity, and even with the "Dredgerman's overload rating"—"Sock it to her!"—"Have at it!"—"Get out the mud!"—there are few standardized practices in dredging and many of them are considerably unorthodox.



SKETCH OF POWER DISTRIBUTION
DREDGE "MARSHALL C. HARRIS"

Wiring System

Installation and wiring layouts followed, based on the characteristics of the equipment selected. To insure results it was necessary for the installation man to have a thorough understanding of the operation of the equipment and the benefit of the owner's experience from other jobs.

The principal requirements of the wiring system were:

- (a) to be carefully and accurately circuited
- (b) to be safe and durable
- (c) to be flexible for future repairs
- (d) to be economical in cost.

After full consideration of all factors involved, it was decided to use the all-metal conduit and wire system with approved ducts and fittings. All power cables are single-conductor stranded. Rubber covered wire was used on alternating and direct current up to 600 volts. For 2200 volt circuits, 5000 volt varnished cambric insulation with double weather-proof braid is used. No cable over 750,000 centimeters in size was used to give flexibility in ordering material and in space required for conduit elbows and other fittings.

The diagram herewith shows the general distribu-



Hazard Lay-Set Improved Plow Steel Preformed Wire Rope Is the Choice of Builders of . . . "MARSHALL C. HARRIS"

Pacific Coast's Newest and Most Powerful Electric Suction Dredger

The American Dredging Company, owners of the "Marshall C. Harris" selected LAY-SET Preformed wire rope for the new dredger after years of economical wire rope service from LAY-SET on their large fleet of suction and clam shell dredgers.

Hazard Wire Rope Company Inc.

WIRE ROPE MANUFACTURERS SINCE 1846

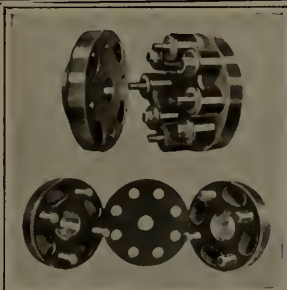
Seattle

Tacoma

San Francisco

Los Angeles

Denver



UNFAILING power
transmission for the
"MARSHALL C. HARRIS"

The giant task of transmitting almost 4000 horsepower on this new suction dredge is accomplished with the famous "R" series Fabco Flexible Couplings. We are proud to add this most modern electric driven dredge to our long list of 100% Fabco equipped jobs.

From the 2500 horsepower main pump drive to the 10 horsepower air compressor, smooth silent power transmission is assured. Fabco Flexible Couplings utilize the cushioning effect of live, resilient rubber, in a new way, to protect bearings and gears from the shocks of reversing and intermittent loads. Our engineering department will be pleased to furnish details of the couplings and power transmission problems of the "Marshall C. Harris." This service is also available for any power transmission problem.

F. A. B. MANUFACTURING CO.

OAKLAND, CALIFORNIA

*** DISTRIBUTORS IN PRINCIPAL CITIES ***

...the American
Dredging Company
took no chances!

Quality Material Is Used Throughout the
"MARSHALL C. HARRIS"

DUNNE PAINT

was selected after severe tests—

The following paints were used:

DU CALITE *Non-Bilge White*

DUNNE *Aluminum Paint*
[U. S. Government Specifications]

DUNNE *Hull Black*

Prices and Samples on Application

Frank W. Dunne Co.

Makers of Good Paint

OAKLAND, CALIF.

6000 LBS.
OF

BRONZE BEARINGS

Made by

PACIFIC BRASS FOUNDRY
of San Francisco

528 FOLSOM STREET, SAN FRANCISCO

EVERDUR
Corrosion-Resisting
CASTINGS

SHAW METAL
Non-Abrasive
Bearing Metal

BRASS
BRONZE
ALUMINUM

for the "MARSHALL C. HARRIS"

tion of current to the various units and the pictures show the high class of work done by the Pacific Electric Motors Company installation engineers.

Miscellaneous Electrical Equipment

Main outdoor switch-house
 General-Electric, 300 amperes, 15,000 volts
 Main power transformers Gardner-
 Electric, three 1400 K.V.A., 11,000 to 2200 volts
 Auxiliary power transformers
 General-Electric, three 75-K.V.A., 2200 to 440 volts
 Lighting transformer Gardner-
 Electric, one 25 K.V.A., 440 to 220 110 volts
 Air Heaters . Miscellaneous, 220 volts, approx. 15 K.W.
 140 volt auxiliary switchboard
 Drendell-Trumbull "Convertifuse"
 Lighting panel Drendell-Trumbull
 Emergency lighting set... Universal, 4 K.W., 110 volts
 Arc welding set
 General-Electric, 300 amperes, portable type

Auxiliary relays (main pump)	Allen Bradley
Recording tachometer	Bristol
Magnetic clutch (rutter)	Cotler-Hammer
Pressure switches (air compressor)	Penn Electric Switch Co
Lighting fixtures	Isthmian
High voltage insulators and connectors	Pacific Electric Mfg. Corp.
Conduit fittings	Crouse-Hinds Co
Crane collectors	Pacific Electric Motor Co.
Porcelain lined bushings	Appleton Electric Co.
Junction boxes and ducts	Yager Sheet Metal Co.
Conduit and cable	General-Electric
Welding electrode	General-Electric
Sarchlight	Sperry Gyroscope Co.
Floodlight	General-Electric-Nalox
Submarine cable	General Electric

[illegible]

▲ 7 8 9 0 1 2 3 4 5 6 7 8 9 0

[illegible]

Abbreviations: S - Song - Vulture - G - G
P - Pilot - G
A.C. - Air - G
E - E - G

P V - Power Factor
 T E - General Electric Co.
 V - Voltage
 W - Watts

Table giving characteristics of electric motors used for the main power unit and the auxiliaries of the dredge Marshall C. Harris.



Byrd Photo

Left to right, Chief Engineer Jack Lewis and Captain Axel Strom of the Dredge Marshall C. Harris.

The MARSHALL C. HARRIS

will be PROTECTED *from* RUST!

FISHOILENE

From the moment that FISHOILENE is applied to the steel and iron surfaces of this vessel, absolute protection is assured. FISHOILENE is proving its worth on various marine jobs, where penetration is an important factor. The function of FISHOILENE is that of protection for metal—not protection of rust.

Rust and Fishoilene Don't Get Along Together

May we tell you how FISHOLENE can protect your metal, wood and cement surfaces! Ask for complete details.

Pacific FISHOILENE Company

INCORPORATED

1217 BIRCH STREET, LOS ANGELES

724 BATTERY STREET, SAN FRANCISCO

Weight-Lifting Feat

The Haviside Company of San Francisco Easily Handles 140-ton Dredge Ladder with Derrick Barge Equipment

WHEN the Golden State and Miners Iron Works of San Francisco contracted to build the dredge Marshall C. Harris, which was to be finished at the yard of the American Dredging Company at Oakland, the question of moving certain heavy assemblies of the dredge machinery across San Francisco Bay entered prominently into the cost of construction. The heaviest of these assemblies was to be the huge ladder with its nose and hinge castings, cutter and cutter shaft. This would weigh 294,000 pounds.

The Haviside Company was called in for consultation, and, after a check up of its equipment and the shape and dimensions of the ladder, the Company assured the contractors that this equipment could handle such an assembly up to a weight of 175 tons.

Thus assured, the Golden State and Miners Iron Works built the huge assembly of the dredge ladder in their First Street Shop, San Francisco, and Farnsworth and Ruggles of San Francisco moved it down to the waterfront at the south side of Pier 36.

Engineers having previously calculated the balance point of the ladder, Haviside arranged his slings so that the 100-ton derrick barge Haviside No. 4 took two-thirds of the load and Haviside No. 5 took one-third, while the light, handy, long-boom derrick barge Haviside No. 3, stationed outboard of the other two barges, steadied the lift.

The load was lifted and the derrick barges, with this load, were pulled out into the middle of the slip. A floating dock of the Harbor Tug & Barge Company was then maneuvered into the place between the barges and the pier, and the ladder was placed on blocking on this dock. This blocking was arranged so that the ladder would be in exact position to ship onto the hinges pre-

pared for it on the forward end of the dredge hull. This dock with its load was then towed over to Oakland.

The dock having four pontoons, it was possible by slight adjustments of the water ballast to bring the ladder hinges into exact alignment and to drive home the hinge pins.

In making this lift, American Steel & Wire Company wire rope was used throughout. Slings and lashings were galvanized plow steel, 6-37; boom lifts and hoisting falls were Monitor brand improved plow steel, 6-19; all shackles, links, and other fittings in the steel line were of heat-treated chrome vanadium steel.

Two noteworthy features are brought out prominently in this achievement:

First, the ability of Haviside executives to take care of special weight lifting problems;

Second, the unusual qualities of Haviside weight-lifting equipment.

Incidentally, it might be remarked that the unusual concentration of weight was a severe test that found no lack in the design and construction of San Francisco piers.

In addition to this hoisting and consultation service, The Haviside Company supplied for the dredge Marshall C. Harris the oakum for calking the seams of the wooden hull and the spikes for securing deck and planking.

It is an established fact, well known to all seafaring men familiar with the world's harbors, that the Port of San Francisco has a greater floating plant for the lifting of heavy weights and for the dry-docking of large vessels than any other port in America and possibly than any other port in the world.



This interesting illustration shows three of the derrick barges of The Haviside Company lifting the 294,000-pound dredge ladder from the pier on the San Francisco Embarcadero and adjusting it on the blocking on a floating dry-dock for transportation across the Bay to be attached to the dredge Marshall C. Harris.

—Morton Photo

Turbine Steamship Manhattan

(Continued from Page 336)

Massive square columns support the center well which extends two decks in height, and half columns of the same kind frame the paintings and extend to the trestle beams upholding the skylight. Indirect cove lighting from below the paintings heightens the dramatic effect.

An important item in the architectural scheme is the enormous fireplace across the forward end of the room, formed of limestone blocks fitted into diagonal lines. An ornament of hand wrought iron, copper, and bronze by Oscar Bach, incorporating the Indian chief's feathered headdress, bows and arrows and peace pipe, decorates either corner. Huge logs will make a glorious fire on cool evenings, for this is a real wood-burning hearth, an unusual luxury in shipboard life. A fender bench twelve feet long and extending out four feet, surrounds the fireplace. Totem pole designs in color decorate the massive legs and stretchers, and the upholstery is of copper-hued leather. In the recess at the opposite end of the room is the special buffet designed to contain the cigar counter.

Color has been introduced into the columns, frieze, and beams by deeply incised, bold designs into which have been rubbed raw, chalk tones of reds, blues, yellows, and greens. The same use of inlaid color is carried out in the furniture, where the Indian symbols are applied as decoration to the conventional and comfortable English Renaissance-type chairs, tables and lounges. Much of the upholstery is done in heavy leathers, for which a special process was developed to resemble primitive tanning, and giving a mottled effect in golden tans and browns, copper and rust. The fabric upholstery is of roughly textured tapestries and homespun, the strong colors blended and subdued. Seven sofas, some of them covered in leather, others in fabric, afford comfortable lounging places, and grouped about them are inviting arm chairs and a profusion of low tables. A huge, square poker table, carrying out the same massive lines and Indian motifs as the fender bench, is placed in the center of the room directly below the ceiling well.

The well is lighted by hanging lanterns bound in wrought iron with pendants of colored enamels. Small ceiling lights, octagonal in shape and flush with the ceiling, have primitive silhouettes of men and beasts in black metal. Valances of the mottled coppery rust leather are used at the full length windows, and the hangings are of heavy coarsely woven silk in bold red, green, and yellow, the broken stripe suggesting the Navajo pattern. The floor is of resilient rubber tiling in blocks with alternating patterns of the Indian swastika and arrow heads.

Veranda Cafe

The after end of the smoking room opens through a vestibule, port and starboard, to the veranda cafe, where we find the interior decorator and architect have produced in very effective fashion a vivid and glamorous setting of ancient Venice.

The oval dance floor in the center is surrounded by torsade columns of dark walnut, their gilded capitals carved in grape leaf and flower design. The narrow iron-grilled windows have the pointed arch and are

separated by the small twisted and painted columns characteristic of that day and place. Parchment colored plaster walls are decorated with a diamond trellis pattern in subdued tones of salmon-rose and sky blue, toned to give an appearance of great age. The ceiling is beamed in dark walnut, the sides of the beam faces painted in small designs of dull reds and blues. The same colors are used on the cream background of the flat spaces between.

Lanterns of amber glass in the form of six pointed stars, copied from the famous Donizetti Palace, hang from the beams. The short drapes at the casement windows are of Italian finished silk brocade in a soft old rose color. Beneath the window groups at either end are two small sofas in the graceful Venetian design, with loose back cushions, upholstered in brocades of rich jewel tones. Occasional chairs and tables scattered through the room were all designed especially for this setting and exemplify the graceful, curved lines of the period. Chairs surrounding the dance floor are painted parchment color and covered with brocatelle in light, gay colorings. The doorways of this colorful room open out onto the spacious after promenade deck, which may be used as a continuation of the dancing space in fine weather.

A service bar adjoins the vestibule on one side and a deck pantry opens from the vestibule on the opposite side. Both of these open into the smoking lounge so that their facilities are available to both rooms.



The cabin class smoking room, pictured above, carries out in its architectural and structural motifs the American Indian life and history. A very unusual feature on shipboard is the huge fireplace designed for burning real logs.

Staterooms

Cabin and tourist class staterooms on the steamship Manhattan are spacious in size, of great charm in interior decoration, and are equipped with every modern device for comfort at sea. All rooms are furnished with wooden beds equipped with the latest marine type of ventilated spring filled mattresses and steel of springs made especially for this job. Interior finish on all of these rooms is in Haskelite paneling faced in beautifully grained woods including African mahogany, oriental walnut, lacewood, domestic sycamore, prima vera, and birch, with borders in woods of contrasting color tone. Furniture and drapes are designed to harmonize or match with the wood paneling in each room.

All rooms are completely carpeted over cork tiling to absorb noise and vibration. The great majority of cabin class rooms have private or connecting toilet and bath or shower. All rooms have running hot and cold fresh water. A Diehl electric oscillating fan is installed in each room.

On all night stands and dressers the tops are of Westinghouse Micarta in finish to match the furniture. This material is impervious to stain or to cigarette burns.

Main Galley

Immediately aft of the cabin class dining saloon on C deck are the main galleys and pantries for serving that room and the tourist class dining saloon on the same deck is just aft of the galley.

The main galley is 80 feet wide by 105 feet long including the area occupied by the various pantries and auxiliary spaces at the sides of the vessel. The cooking equipment is in general electrical and of the most approved type. The floor of all pantries and galleys is covered with nonslip carborundum tile. The central section of the main galley, running fore and aft, contains the large working kitchen with ranges and steam tables, the silver room, the chef's office, ice cube cabinet and cutters, and the Kosher kitchen. The working space is occupied with a battery of 12 Edison electric ranges, each range being 31½ inches high by 43 inches deep by 48 inches wide and having a 14 inch by 26½ inch by 21 inch oven. Also three steam tables with Monel metal tops and warming closet below. The Kosher kitchen is furnished with one small Edison electric range, one meat block, and necessary tables and shelving.

Pantries

The pantry spaces and the principal equipment installed in each are as follows:

Beverage Room: One Gilchrist No. 22 drink mixer, one Sunkist fruit juice extractor, beverage coils, steam hot-water urn, brine-cooled refrigerator for bottle stowage, and the necessary sinks and stainless steel topped work tables.

Garde Manger: One Hobart electric slicing machine, one Hobart electric meat chopper, one brine cooled refrigerator, and the required tables and sinks.

Silver Room: One Fastspray washer for silver, one Koppen electric knife cleaning machine, and silver and glass cabinets.

Cabinet Dish Washing Room: One Fastspray dish washing machine, generous sink facilities, and adequate tables and racks for stowing plate creels.

Vegetable Room: One Hobart electric vegetable cutter, one Hobart electric potato peeler, one hand-powered French fry cutter, sinks, and the necessary work tables with stainless steel tops.

Grill Room: Two Edison electric broilers, one Edison electric frier, one electric rotisserie, one 26 by 6-foot steam table, sinks and work tables.

Butcher Shop: One large brine cooled refrigerator fitted with meat hooks and shelving, one Stecker pedestal type electric slicing machine, one pedestal type and one bench type Hobart electric meat chopper, a throw box, meat blocks, sinks, and monel metal and marble top tables for meat handling.

Coffee Pantry: Edison electric appliances including automatic egg boilers, waffle irons, griddles, and toasters. Two 15-gallon coffee urns, one 18-gallon hot water urn, one 5-gallon milk urn, one urn stand with chocolate pots, a brine cooled refrigerator, and a warming table with closed monel metal top.

Cold Pantry: One Sunkist fruit juice extractor, one bench type hand-powered, Hobart meat slicer, one Hobart electric meat chopper, and the necessary refrigerators, sinks, and work tables.

Pastry Shop: One 30- to 60-quart Hobart electric mixer, one 20-quart aluminum steam kettle furnished by the Aluminum Cooking Utensil Co., one Edison electric bake oven, one Frigidaire 3-hole ice cream cabinet, one brine cooled refrigerator, sinks, pan racks, and work tables.

Steam Kettle Space: One 80-gallon, two 60-gallon and two 40-gallon aluminum steam kettles furnished by the Aluminum Cooking Utensil Co., two vegetable cookers supplied by W. F. Dougherty Sons, pot racks, and tables.

Bake Shop: Two Edison electric bake ovens having a capacity of about 44 loaves each, two dough troughs of ash, one 2-barrel electric drive Century dough mixer, one 20-gallon aluminum hot water kettle furnished by Aluminum Utensil Co., one proofing oven supplied by W. F. Dougherty Sons, one hand power roll cutter, one hand power apple peeler, and the necessary work tables.

Tourist Pantry: One Frigidaire 2-hole ice cream cabinet, one brine-cooled refrigerator, Edison electric appliances including six automatic egg boilers, one toaster, and one griddle. In addition two 12-gallon coffee urns, one 15-gallon hot water urn, one 5-gallon milk urn, one urn stand with chocolate pots, one warming closet, sinks and tables.

Tourist Dish Washing Room: One Fastspray dish washer, sinks and tables and shelving for stowing dishes.

Tourist Class Dining Saloon

Extending to the full width of the hull and seating 250 persons, the tourist dining saloon is one of the most interesting and unique rooms on the ship. The motif for interior architecture and decoration in this room is based on sailing ship construction and the early days of pioneering and navigation. Massive columns and ceiling beams, quaint lighting fixtures and sturdy, comfortable chairs and tables carry out this trend.



Trade Literature

Part Series No. 7, covering the **Ports of Seattle, Tacoma, Everett, Bellingham, and Grays Harbor, Washington**, has been issued jointly by the Board of Engineers for River and Harbor, U. S. War Department, and the U. S. Shipping Board.

This report is published in three separate volumes. Part I pertains to Seattle; Part II to Tacoma; and Part III includes Everett, Bellingham, and Grays Harbor. The report is intended for the information and use of federal, state, municipal, port agencies and others interested in the development of harbors and the establishment of port and terminal facilities. The revised volumes contain information with regard to port and harbor conditions, port customs and regulations, services and charges, fuel and supplies, and all other information pertaining to the conduct of a port for general commerce. Copies may be obtained from the Government Printing Office, Washington, D.C.

Port of Long Beach, California, has issued a comprehensive booklet covering the development and facilities of the harbor at Long Beach. It contains 12 pages and many illustrations, with insert maps of present and proposed harbor work.

Four to Six Per Cent. Chromium Steel Tubes and Pipe is the title of a new 16-page bulletin issued by The Babcock & Wilcox Tube Company. This publication presents, in technical style, the advantages of 4 to 6 per cent. chromium steel tubes and pipe for refinery and other services. It contains recommended uses, complete chemical and physical characteristics, and data on 4 to 6 per cent. chromium steel with tungsten and molybdenum.

Kortick Pole Line Hardware and Specialties is the title of Catalog No. 32 recently issued by Kortick Manufacturing Company, 345 First St., San Francisco. This is a very well prepared, loose-leaf catalog, nicely printed and illustrated on fine coated stock, and it contains a complete list, with tables, sizes, etc., of the certified Kortick products, manufactured of highest quality materials and carried in stock at all leading Pacific Coast

points. A unique feature of the catalog is an alphabetical and a numerical index of the products listed. Copies may be had on request.

Wailes Dove Coatings for building maintenance is the title of a leaflet recently issued by the Wailes Dove - Hermiston Corporation, describing the uses for its products Bitumastic and Hermastic to industrial use. Seventy years experience with corrosive conditions has produced Bitumastic Enamel for coating water tanks, brine tanks, filters, sprinkler systems, etc. Hermastic is a floor covering developed after many years of experimentation.

Revised Publication on Foreign Bunkering Stations. Foreign port Series No. 3, "Foreign Bunkering Stations and Charges Against Vessels" (Revised, 1932) contains information on foreign coal and oil bunkering stations including operator and nationality, kind of coal or oil, storage capacity, normal supply, berthage and depth of water, methods of delivery, and other details. It contains also 100 pages of data on charges against vessels calling for bunkers only. Copies may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., or from any district office of the Bureau of Foreign and Domestic Commerce; 20 cents.

Wire Cloth Handbooks.—A new general catalog, No. 32, has been issued by the Newark Wire Cloth Company, Newark, N. J. The new catalog has many novel and distinctive features and is somewhat of a handbook on wire cloth and wire cloth products, containing more than 100 pages of concise information of value to both inexperienced and experienced users. The catalog contains a glossary of wire cloth terms.

Engineering Data, Industrial Rubber Goods.—This is a condensed price-list and catalog, just issued by the B. F. Goodrich Rubber Company, containing engineering information and data never before published. The booklet is profusely illustrated with pictures of pro-

ducts and tables. It contains tables giving information on rubber transmission belting, such as horse power capacities, minimum pulley diameters, etc.

Condensed Catalog.—Illustrated descriptions of every principal product manufactured by The Babcock & Wilcox Company are contained in the latest publication issued by that organization.

This complete catalog not only describes the design and construction, but also gives the operating characteristics of modern equipment for power, industrial, and process plants.

New engineering developments shown include a discussion of the striking advantages of Mercury-Vapor and Diphenyl and Diphenyl-oxide as heat transfer mediums, and a new fully automatic process permitting substantial savings in the manufacture of sulphite pulp.

Copies may be obtained by addressing The Babcock & Wilcox Company at San Francisco, Portland, Seattle, or Los Angeles.

Goodrich One in Two Tape is a little booklet describing the uses of combination rubber tape and friction tape, a product new to most electricians and contractors yet claimed by the manufacturers, B. F. Goodrich Company, to be thoroughly proved and tested in all kinds of electrical work. Copies are obtainable on request.

A Wise Choice

Taylor Heads Diesel Group.—The Diesel Engine Manufacturers' Association has recently announced the election of H. Birchard Taylor of Philadelphia as president, succeeding George W. Codrington of the Winton Engine Company of Cleveland, who was elected chairman of the Board. E. T. Fishwick of the Worthington Pump and Machinery Corporation continues as chairman of the executive committee. Mr. Taylor proposes to devote a considerable proportion of his time to the active management of this association.

The Diesel Engine Manufacturers' Association was organized in 1928 and has since been active in promoting trade standards in the diesel industry and in gathering diesel engine statistics.



American Shipbuilding

Edited by H. C. McKinnon

The Carter Bill.—Although shipbuilding in the United States is at low ebb—and Lloyd's statistics show that new construction has reached the lowest point in world shipyards in fifty years — there must be a turning of the tide before long and the construction of modern freighters for the carrying of cargoes must certainly be undertaken in the near future.

Pacific Coast shipbuilders are perennially hopeful of obtaining even a small share of shipbuilding contracts, and considerable interest is being manifested in the progress of the Carter Bill toward enactment into law during the next meeting of Congress.

According to statement made by H. J. Anderson of the Pacific Coast Drydock Association, with the return of Congressman Carter from Washington, an optimistic note has been sounded as to the possibility of the passage of this bill to place the Pacific Coast shipyards in a more favorable position to bid on new construction. After the visit of H. Gerrish Smith, president of the National Council of American Shipbuilders last May, he returned to Washington, where he conferred with Congressman Carter, and they have outlined a campaign to draw the attention of members of congress to the advisability of enacting this bill into law at the next session of Congress in December. Mr. Smith is in a position by authority of his connections and very high standing with eastern shipbuilders to be a great assistance to the cause of Pacific Coast yards, and he has offered to do the very utmost of his ability to persuade the Atlantic Coast yards to withhold any opposition to this bill. With the opposition of the eastern shipbuilders removed, the bill should have clear sailing in the committee and before the House.

A Pacific Coast committee has been active in sponsoring and advocating the passage of the bill, and J. Scott Ryder, the general chairman, has been successful in getting a united front from the entire Pacific Coast. With the active support of all Pacific Coast inter-

ests, it is hoped that the Carter Bill will receive favorable action by the Seventy-Second Congress this winter.

This bill provides $\frac{1}{2}$ of one per cent. less interest on Shipping Board loans if ships are built in Pacific Coast shipyards. Experts figure that this differential in operating cost will enable shipowners to pay 4 per cent. more for a Pacific Coast built ship without increasing their standing charges.

Equipment Contract Let. — McGinitie & McDonald, consulting engineers, Ferry Dock, Seattle, have been awarded contract for supplying machinery and equipment to the new Alaska river steamer building by the Berg Shipbuilding Company of Seattle for operation on the Yukon River. The vessel will be shipped knocked-down to Alaska and assembled at Nenana.

This vessel is to be 210 feet long, 42 feet beam, and of 3 ft. 6 in. loaded draft. She is to be powered by two tandem compound engines driving a stern wheel. A heavy duty iron, fire-tube, locomotive type boiler, designed with a large fire-box for the burning of wood fuel, will be supplied by the Washington Iron Works of Seattle. Contract for electric and condensing equipment has been let to the Westinghouse Electric & Manufacturing Company. Pumps are to be Worthington.

Contract Awarded for Barges. — The Moore Dry Dock Co., Oakland, Calif., has been awarded contract by the R. W. Kaltenbach Corporation of Bedford, Ohio, for the construction of the two pontoons and for erecting the gear for the two navy derrick barges for Mare Island Navy Yard and the naval base at San Diego.

The barges will be of steel, 100 ft. long by 45 ft. wide, 10 ft. depth. They are to be self-propelled, power to be supplied by a 250-horsepower Fairbanks-Morse diesel engine. The derricks, arms, and gear will be shipped from Bedford and will be installed and tested at the

Moore Plant, probably in November.

Steel Fuel Barge Ordered. Ma-rietta Manufacturing Company, Point Pleasant, West Virginia, has received an order for a 110-ft. steel fuel barge for the Campbell Transportation Company of Pittsburgh, Pa. This barge will have a beam of 24 ft. and depth of 8 ft.

Colombia Liner Launched.—The first of two combination passenger and freight steamers for the Colombia Mail Steamship Company of New York was launched on August 9 by the Newport News Shipbuilding & Dry Dock Co. Keel for this vessel, named Colombia, was laid February 2, 1932, and she is scheduled to enter service in November between New York and Port-au-Prince, Haiti, Kingston, Jamaica, and Puerto Colombia, with calls at Panama Canal Zone. The Colombia and her sister ship, Haiti, are being built under the provisions of the Merchant Marine Act, 1928, and the favorable conditions of government loan and mail contract. They are 404 ft. 3 in. length overall, 57 ft. 6 in. beam, 31 ft. 6 in. depth, powered by steam turbines and are to have a sea speed of 16 knots. Each vessel has 54,000 square feet of refrigerated cargo space.

Contract Placed for Lighthouse Tender Arbutus. — The Pusey & Jones Corp., Wilmington, Del., has been awarded contract for the construction of the service vessel Arbutus for the Department of Commerce, Bureau of Lighthouses, on a low bid of \$239,800 and delivery in 300 days. The Arbutus is to be 174 ft. long. She will have twin screws and will be powered by two triple-expansion steam engines developing 1000 horsepower at 150 revolutions per minute.

Bids submitted for this job were as follows:

The Pusey and Jones Corp., 300 days, \$239,800.

Bath Iron Works, 300 days, \$255,887.

United Dry Docks, Inc., 300 days,

\$266,800.

San Shipbuilding and Dry Dock Co., 180 days, \$299,000.

Mantowoc Shipbuilding Corp., 300 days, (Foster Wheeler Boilers) \$303,200. (Babcock & Wilcox boilers) \$310,200.

Todd Dry Dock Engineering and Repair Corp., 315 days, \$311,440.

Tampa Shipbuilding and Engineering Co., 300 days, \$316,000.

New York Shipbuilding Co., 300 days, \$325,000.

Bethlehem Shipbuilding Corp., 362 days, \$398,600.

Electric Boat Co., 300 days, \$400,000.

Contract for Tender Wistaria.—United Dry Docks, Inc., Mariner's Harbor, Staten Island, N. Y., has been awarded contract for construction of the lighthouse tender Wistaria for the Department of Commerce, Bureau of Lighthouses, Washington, D. C. This ship is to be 121 ft. long and a sister to the tenders Linden and Columbine. She is of single-screw type and will be powered by diesel-electric power plant to give her a speed of 16 knots. She is intended for use in the inside waters of the Delaware Bay.

Low bid by the United Dry Docks, Inc., was \$129,900 and 240 calendar days. Second low bid was by The Pusey and Jones Corporation, \$134,750. A large number of bids from other eastern yards were submitted, ranging up to \$211,300, showing a wide diversity in price for this small craft.

Transport Repairs.—General Engineering & Drydock Company, Oakland and San Francisco, was awarded contract recently by the U. S. Army Transport Service, San Francisco, for repairs to the transport Meigs on a low bid of \$4947. Other bids were: United Engineering Works, \$5731; The Moore Dry Dock Co., \$6389; Bethlehem Shipbuilding Corp., \$6571; Columbia Machine Works, \$5973; Neptune Machine Works, \$7190.

Repair Job.—The Moore Dry Dock Company, Oakland, Calif., is performing repairs to the steamer Trinidad which will cost \$12,858. The Trinidad had a large hole in her bow as the result of a collision with the steamer Brookings off Pt. Gorda in a fog. Other bids submitted for this repair work were by General Engineering & Drydock Co., \$17,936, and by the Bethlehem Shipbuilding Corp., \$18,490.

Bethlehem Repairs Brookings.—The steamer Brookings, which was damaged in collision with the steamer Trinidad, went on dry-dock at the Potrero graving docks of the Bethlehem Shipbuilding Corp., and it is estimated that repairs will cost about \$24,000. About 15 feet of bow was cut away and a new one constructed.

Washington Launched.—The express passenger and cargo liner Washington for the North Atlantic Service of the United States Lines, and sister to the Manhattan, was launched August 20 by the New York Shipbuilding Company, Mrs. T. V. O'Connor, wife of the chairman of the United States Shipping Board, acting as sponsor.

The Washington is 666 ft. between perpendiculars, 86 ft. beam, and 32 ft. loaded draft maximum. She will be powered by geared turbines developing 30,000 shaft horsepower and driving the hull at a sea speed of 20 knots. Steam will be supplied by six Babcock & Wilcox boilers.

Extension on Ship Loans.—According to a decision handed down by Comptroller-General J. R. McCarl of the United States, the United States Shipping Board has legal right to cause an extension of time for payment of ship construction loans and payments on the ship purchases granted to certain companies under the provisions of the Merchant Marine Act of 1928.

By assuming responsibility for the jurisdiction of ocean mail contracts funds paid over to companies indebted to the Government, the Shipping Board will be permitted to extend ship purchase notes.

Veragua Delivered.—Bethlehem Shipbuilding Corp., Ltd., Fore River Plant, Quincy, Mass., delivered the steamship Veragua to the United Fruit Company last month and the vessel sailed on her maiden voyage to Havana, Kingston, Cristobal, and Port Limon on August 11. She is the fifth new vessel to be delivered this year to the Great White Fleet, and the third and last under construction contract with the Bethlehem plant.

The Veragua, like her sister ships, Antigua and Quirigua, (and Talamanca and Chiriqui built by Newport News), is 446 ft. length over all, 60 ft. beam, and 34 ft. depth, with loaded draft of 24 ft.

She has turbo-electric drive, her power plant developing 10,590 indicated horsepower. These vessels are primarily refrigerated cargo vessels, but are all equipped with luxurious accommodations for 113 passengers in first class.

Equip Floating Reduction Plant.—The Fisherman's Products Co., Inc., an association of purse seiners, has purchased the former whaling steamer Lansing and is equipping the vessel, at Berth 59, Los Angeles Harbor, for operation as a fish meal and oil reduction plant.

The vessel is said to be scheduled for operation outside of the three-mile limit off the Golden Gate and will have a crew of approximately 65 men, and her equipment is said to cost about \$120,000. The vessel is 389.4 ft. long. She will be equipped with oil presses and tanks of 60,000 gallons capacity. Driers eight feet wide and 55 feet long are being installed at the after end of the ship. The reduction plant will be fed by twelve to fifteen seiners, all of whom are said to be partners in the enterprise.

Convert Oil Barge.—The Hillcone Steamship Company, 311 California St., San Francisco, has purchased the old navy water barge No. 30 at San Diego and has brought her to San Pedro to convert into oil barge. The barge was originally the dredger Renfew, used by the British in maintenance work on the Suez Canal. During the war it was purchased by the American government and used as a water service barge at Brest, later in New York and then in San Diego. The Hillcone Steamship Company operates several small tankers in coastwise and harbor trade, carrying cargoes for such firms as the Sunset, Pacific, Hancock, Western Oil and Refining, and McMillan oil companies.

Deliveries

Four barges for American Barge Line Co., by American Bridge Co., in July.

One steel side dump scow for Contracting Dept., Dravo Contracting Co., in July.

Dearborn, diesel-electric tug for Ford Motor Co., Detroit, by Great Lakes Engineering Works, July 15.

Manhattan, passenger and cargo vessel for United States Lines by New York Shipbuilding Co., July 27.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of August 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W. Seattle, Wn.

Not named, wooden hull, stern-wheel, river steamer for Alaska Railroad, Dept. of Interior, Bell St. Terminal, Seattle, Wn.; 235 L.O.A.; 210 L.B.P.; 6 ft. depth; 3'6" draft; 2 tan. comp. steam engs.; wood-burning boilers; 100 pass.; 300 tons freight; keel 7/13/32; deliver 5/10/33 est.

U. S. NAVY YARD, Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 10/2/32 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD, Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31; deliver 2/11/34 est.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: smtr. Emidio, smtr. Admiral Senn, smtr. schr. Chahalis, U. S. dredge San Pablo, smtr. F. H. Hillman, barge Santa Paula, smtr. Pennsylvania, smtr. Malolo, smtr. President McKinley, smtr. J. C. Fitzsimmons, tug Gov. Markham, dredge Major Tilden, smtr. Tulsagas, smtr. President Pierce, smtr. Admiral Gove, smtr. Lake Galewood, smtr. President Grant, tug A. G. Wells, smtr. Yarraville, smtr. El Segundo, smtr. Point Fermin. Repair smothering lines: smtr. Olympia. Alterations to main steam line, etc.: smtr. Lansing. Repair revolution counter: m. v. Silvermaple. Re-temper springs for M. E. air compressor: m. v. Silvercypress. Engine repairs: smtr. Admiral Chase. Make 2 1/2-in. iron pipe: m. s. Otokia. Drydock, clean, paint: launch Columbus. Miscellaneous: whaler Barbara, smtr. Deroche, m. s. Lio, killer boat Columbus, smtr. Georgian, smtr. Talamanca, smtr. Chiriqui, smtr. Monterey, U.S.A.T. Ludington, smtr. Arizonan.

GENERAL ENGINEERING & DRYDOCK CO.

Oakland Plant: Drydocked, repairs to rudder and pilot house: Western Pacific Cargo No. 3. Drydock and general repairs: smtr. Napa Valley. Drydock and engine and deck repairs: smtr. Makawao. Drydock and misc. repairs: smtr. Santiam. General repairs: U.S.C.G. Cahokia.

Alameda Plant: Drydock and misc. repairs: g. s. Sutter, smtr. Saginaw, yacht Rejoice, smtr. Lake Miraflores. General overhauling: tug Mercules.

THE MOORE DRY DOCK COMPANY Oakland, Calif.

Drydock and general repairs: smtr. Jaxco, Siem Helmer barge, smtr. Caddopeak,

smtr. Golden Peak, smtr. Mauna Ala, smtr. Democracy, smtr. Montanan, smtr. Minnesotan, U.S.A.T. tug Slocum (install oil burning equipment and fuel tanks), ferry Napa Valley.

PRINCE RUPERT DRY DOCK AND SHIPYARD Prince Rupert, B.C.

Docked for examination, keel and shoe trimmed and temporary shoe fitted: motor yacht Cancolim. Docked, cleaned, painted: misc. hull and engine repairs: 5 fishing boats. Misc. hull and engine repairs not requiring docking: 18 fishing boats.

U. S. NAVY YARD Bremerton, Wash.

Repairs and docking: Saratoga, Colorado, Arizona, West Virginia, Neches, Detroit. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY, Pittsburgh, Pa.

Purchasing Agent: W. G. A. Millar.
12 barges for American Barge Line Co., Louisville, Ky.; 158 x 35 x 11 ft.; 182 net tons steel each; 4 delivered; balance 8/20/32 est.

BATH IRON WORKS Bath, Maine

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed; deliver 6/11/34 est.

Not named, hull 155, quarantine tug for U. S. Public Health Service, Boston; 60 ft. long; 15 ft. beam; 7 ft. depth.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington, D.C.; 131 long; 24'6" molded beam; 8'6" molded draft; 500 H.P. eng.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT, Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement; deliver 8/15/32 est.

Lurline, hull 1447, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20 1/2 knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/32; deliver Jan./33 est.

Veragua, hull 1446, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17 1/2 knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launched 4/23/32; delivered Aug./32.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed; deliver 2/11/34 est.

CHARLESTON DRY DOCK & MACHINERY CO., Charleston, S.C.

All welded river towboat for Pure Oil Co. of Chicago, Ill., to be used on Savannah River; 240 H.P. Worthington diesel eng.; Keck Gonnerman stern wheel drive; keel 7/28/32; launch 9/32 est.; deliver 10/32 est.

COLLINGWOOD SHIPYARDS, LTD., Collingwood, Ont.

Repairs: Bottom damage repairs to smtr. Oakton.

DEFOE BOAT & MOTOR WORKS Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.
Escanaba, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W-T boilers; keel 12/15/31; launch 7/20/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY, Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6"; one delivered.

Hull 1139, steel hull, 20-in. pipe-line, self-propelled, diesel-electric powered dredge for U. S. Engineers Office, St. Louis, Mo.

Hull 1140, same as above.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self-propelled 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.

Myrtle, lighthouse tender for U. S. Dept. of Commerce, Bureau of Lighthouses; 93x23x5 ft.; 2 Atlas-Imperial diesel engs.

ELECTRIC BOAT CO., Groton, Conn.

Cuttlefish, fleet submarine SS171 for U. S. Navy; keel 10/7/31; deliver 12/29/33 est.

Repairs: Clean and paint: schr. yacht Puritan. Renew damaged keel: motor yacht Arab. Install new tail shaft: m. s. New London Socony. Clean and paint: trawler Kingfisher, U. S. Submarine R-14, trawler Tern, yacht Lou, U. S. Submarine R-5, smtr. Catskill (also renew stern bearing). Examine underbody: U.S.C.G. 400.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32.

Santa Paula, hull 122, sister to above; keel 8/4/31; launched 6/11/32.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31.

Santa Elena, hull 124, sister to above, keel 3/24/32.

GREAT LAKES ENGINEERING WORKS

River Rouge, Michigan

Detroit, hull 280, diesel electric tug for Ford Motor Co., Detroit: 75 L.B.P.; 11 ft. beam; 12 loaded draft; 500 S.H.P.; keel 5/9/32; launched 6/14/32; delivered 7/15/32.

HOWARD SHIPYARDS & DOCK COMPANY,

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas City, Mo.: 138 by 30 by 5 ft.; keel 3/21/32; launched 5/31/32; deliver 8/32 est.

MARIETTA MANUFACTURING CO.,

Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.: 132 x 35 x 10 ft.; 8 delivered; deliver balance 8/1/32 est.

Hull 288, steel fuel barge for Campbell Transportation Co., Pittsburgh, Pa.: 110 x 24 x 8 ft.; deliver Oct./32 est.

MIDLAND BARGE COMPANY,

Midland, Penn.

One 15-ton derrick boat for U. S. Engineers Office, Huntington, W. Va.

Huckleberry Finn, tunnel-stern, stern-wheel, diesel-powered towboat for Inland Waterways Corp., Washington, D.C.: 160 by 50 by 8 ft. depth; two 590 B.H.P. McIntosh & Seymour diesel engs.

Tom Sawyer, same as above.

One barge for Ohio Edison Co.: 12x24x4.

NASHVILLE BRIDGE COMPANY,

Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Not named, hull 265, gas launch for U. S. Engineers, Pittsburgh: 40 x 8 x 8 ft.; keel 4/27/32; launched 6/10/32.

Hull 766, 31 ft. workboat for U. S. Engineers, Nashville; keel 6/1/32; launch 7/10/32 est.

Hull 267, deck barge, owner not named; 30x50x9 ft.; keel 8/10/32 est.; launch 9/5/32 est.; deliver 9/12/32 est.

Hull 268, same as above; keel 8/15/32 est.; launch 9/5/32 est.; deliver 9/12/32 est.

Hull 269, same as above; keel 8/19/32 est.; launch 9/14/32 est.; deliver 9/28/32 est.

Hull 270, same as above; keel 8/24/32 est.; launch 9/20/32 est.; deliver 9/28/32 est.

Hull 271, same as above; keel 8/29/32 est.; launch 9/24/32 est.; deliver 9/28/32 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Colombia, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York: 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed, steam turbine drive; 5200 hp. tons; keel 2/29/32; launch 8/6/32 est.; deliver 12/1/32 est.

Haiti, hull 348, sister to above; keel 4/4/32; launch 9/3/32 est.; deliver 12/15/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/31; deliver 5/1/34 est.

Peto, hull 354, passenger and freighter cargo vessel for United Mail Steamship Co.: 446 L.O.A., 60 beam; 34 depth, 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo electric propulsion; 19,500 S.H.P. keel 3/9/31; launched 8/15/31; Reconditioning; deliver 2/26/33 est.

NEW YORK SHIPBUILDING CO.,

Camden, N. J.

Purchasing Agent: J. W. Mecker.

Indianapolis, hull 399, light cruiser No. 33 for United States Navy; 10,000 tons displacement, keel Mar. 31/30; launched 11/7/31; deliver 10/15/32 est.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York: 666 L.B.P.; 86' beam; 32' loaded draft max; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launched 12/5/31; delivered 7/27/32.

Washington, hull 406, passenger and cargo vessel, same as above; keel 1/20/31; launch 8/20/32 est.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.: 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31; deliver 3/3/34 est.

THE PUSEY & JONES CORP.,

Wilmington, Del.

Purchasing Agent, James Bradford

Arbutus, hull 1057, lighthouse tender for U. S. Department of Commerce, Bureau of Lighthouses: 163'6" L.B.P.; 32 beam; 10'7" mean draft; two triple exp. steam engs.; 2 W.T. boilers; 200 lbs. working pressure; contract signed 7/14/32.

SPEEDEN SHIPBUILDING CO.,

Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.: 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng.; keel 3/15/32; launch 8/10/32 est.; deliver 10/31/32 est.

Not named, hull 273, diesel tug for U. S. Public Health Service, New Orleans, La.: 71 L.B.P.; 16'11" beam; 8' depth; 210 B.H.P. Fairbanks-Morse diesel eng.; completion 250 days; keel 7/20/32.

SUN SHIPBUILDING & DRY DOCK COMPANY,

Chester, Penn.

Purchasing Agent: H. W. Scott.

Seatrains New York, hull 146, single screw steamship for carrying loaded railway cars for Seatrain Lines, Inc., New York and New Orleans: 464'6" by 63'6" by 38'3"; 15½ knots speed; 8500 D.W.T. keel 2/24/32; launch 8/27/32 est.; deliver 9/32 est.

Seatrains Havana, hull 147, sister to above; keel 2/24/32; launch 9/3/32 est.; deliver 9/32 est.

UNITED DRY DOCKS, INC.,

Mariner's Harbor, Staten Island, N.Y.

Purchasing Agent: R. C. Miller

Not named, hull 810, tanker for Matco Service Transp. Co.: 64 L.O.A. 16 beam 8 depth 8 M.P.H. speed 100 B.H.P. diesel eng.; keel 7/25/32; launch 8/29/32 est.; deliver 9/1/32 est.

Hulls 811 and 812, two oil barges for Matco Service Transp. Co.: 109 x 36 x 11 ft. keels 7/25/32; launch and deliver 9/1/32 est.

Westaria, hull 813, tender for U. S. Dept. of Commerce, Bureau of Lighthouses: 121'4" L.O.A. 25 beam 9 draft 9½ knots speed diesel electric drive 240 S.H.P. keel

9/15/32 est. launch 1/1/34 est. deliver 2/1/32 est.

U. S. NAVY YARD,

Boston, Mass.

Mr. Doreau, U. S. Torpedo Boat Destroyer D.D. 351 for U. S. Navy: 340 ft. long; 35 knots speed; complete 4/11/34 est.

U. S. NAVY YARD

New York.

New Orleans, light cruiser CA32, for U. S. Navy: 10,000 tons displacement; deliver 6/2/33 est.

Not named, U. S. Torpedo Boat Destroyer (DD 350) for U. S. Navy: 340 ft. long; 35 knots speed; complete 6/11/34 est.

U. S. NAVY YARD

Philadelphia, Pa.

Minneapolis, light cruiser CA36 for U. S. Navy: 10,000 tons displacement; deliver 10/2/33 est.

U. S. NAVY YARD

Portsmouth, Va.

Cachalot, fleet submarine SS170 for U. S. Navy; deliver 9/16/33 est.

Facts and Figures on Operating an Intercoastal Fleet

1000th Voyage. With the arrival at the Port of San Francisco of the steamship Alaskan recently, according to J. R. Fitzgerald, district manager of the American-Hawaiian Steamship Company, the American-Hawaiian chalked up the completion of the 1000th westbound voyage since returning to the intercoastal service following government service in the World War.

To quote Mr. Fitzgerald: "Since our fleet re-entered the intercoastal trade following its World War service, it has steamed a total of 13,800,000 miles, or a distance equal to more than 540 times round-the-world, and has transported approximately 275,000,000 packages of every conceivable kind of general cargo. For its transits of the Panama Canal we have paid the United States Government approximately \$12,000,000 in tolls, which is almost one-thirtieth of the entire cost of building this gigantic public waterway. During this same period the company has paid out more than \$10,000,000 in ships' wages, and over \$26,000,000 in wages to stevedores. All of this is in addition to the many millions of dollars expended during the same time for ships' food, ships' stores and equipment, terminal charges, dock and wharfage fees, harbor dues, ships' repairs, and the vast number of other items that enter into the cost of maintaining and operating a fleet of 23 modern freighters."



Marine Insurance

Marine Accidental Injuries

The Report of the National Safety Council Covering Frequency and Severity Rates for the Main Classes of Marine Industries in 1931

INJURY reports for 1931 for the marine industry came from 55 organizations in which 62,000 employees worked 136,000,000 man-hours during the year. This is a large gain in reporting companies over 1930, when reports were received from 28 units with an exposure of 50,000,000 man-hours, and reflects increasing interest of members in their accident problems. Lost-time injuries during 1931 averaged 24.28 per 1,000,000 man-hours worked, and days lost were 2.87 per 1000 hours worked. These injury rates are high in comparison with 15.12 for frequency and 1.72 for severity in all industries; they give the industry a standing of twenty-third in frequency and twenty-fourth in severity among 28 major industrial groups.

The 1931 experience, however, is heavily weighted by the injury records of shipbuilding and repair yards which number 26, with an exposure of over 107,000,000 man-hours. These had an average frequency rate of

25.01 and a severity rate of 2.41. Tankers, stevedoring, and harbor equipment organizations had lower frequency rates, as shown in Table 1, and, with the exception of tankers, lower severity. More reports from stevedoring units and equipment afloat are needed to give more reliable information on injuries in these divisions. The gains in reporters this year were in the tanker, harbor equipment, and shipbuilding and repair classifications.

In all divisions there were 3301 lost-time injuries, of which 40 were fatalities and 85 were permanent partial disabilities. These injuries resulted in days lost to the equivalent of over 1000 years. Time charges of 6000 days each for fatal injuries account for over half of the total lost time. Injuries of this type are considerably above the average of all industries, and the situation with respect to permanent partial disabilities is only slightly less serious. The severity rate for tempor-

INDUSTRIAL GROUP	No. of Indus- trial Units	Man- Hours Worked (Thou- sands)	Aver- age Number of Emp- loyees	NO. LOST-TIME INJURIES				NUMBER OF DAYS LOST				INJURY RATES	
				Death & Perm. Total	Perm. Par- tial	Temp- orary	TOTAL	Death & Perm. Total	Perm. Par- tial	Temp- orary	TOTAL	Fre- que- ncy	Sev- er- ity
ALL GROUPS	55	136,964	61,865	40	85	3,176	3,301	240,000	70,171	80,708	390,879	24.28	2.87
Harbor Equipment	7	3,984	1,512	1	2	48	51	6,000	1,123	868	7,991	12.80	2.00
Stevedoring	5	954	391	0	0	19	19	0	0	468	468	19.92	.49
Tankers	15	21,162	8,334	12	16	396	424	72,000	12,400	9,274	93,674	20.03	4.43
Shipbuilding and Repairs	26	107,171	50,105	24	64	2,592	2,680	144,000	50,048	64,734	258,782	25.01	2.41
Liners	2	2,695	923	3	3	121	127	18,000	6,600	5,354	29,964	47.16	11.13

Table 1, showing the lost time injuries in the marine industry for 1931 by principal industrial groups.

A Fireman's Fund Marine insurance po
DEPENDABLE
HULLS • FREIGHTS • DISBURSEMENT
FIREMAN'S FUND

NEW YORK
116 John Street

CHICAGO
Insurance Exchange

ATLANTA
Hurt Building

SEATTLE
309 Colman Bldg.

HEAD OFFICE

Year	Man-Hours Worked (Millions)	FREQUENCY RATE				SEVERITY RATE			
		Death & Perm. Total	Perm. Partial	Temporary	TOTAL	Death & Perm. Total	Perm. Partial	Temporary	TOTAL
1931	118.3	.26	.62	21.93	22.81	1.57	.50	.56	2.63
1930	126.3	.22	.79	27.03	28.04	1.36	.56	.59	2.51

Table II, showing the injury rates by type of injury for the marine industry in each of the two years 1931 and 1930 for the thirty-six units reporting.

any disabilities is also high—over twice the average rate for all industries. Employees who had these injuries actually lost, on the average, 25 days from work.

The records of 36 companies are available for both 1930 and 1931, and their combined experience is shown in the chart. A reduction of 19 per cent. was made in frequency but severity is up 4 per cent. The increase in severity is due to the higher fatality rate of 1931, as shown in Table 2. The drop of 21 per cent. in the frequency of permanent partial disabilities, however, and improvement in both the frequency and severity of temporary disabilities is encouraging.

Only a few marine units showed improvement in both frequency and severity during 1931. One of these, which still has higher than average rates, reduced frequency from 83.45 in 1930 to 30.07 in 1931, and severity from 7.07 to 4.89. In another organization, on the contrary, rates have gone up in frequency from 34.0 to 42.0 and severity has doubled. Each organization, obviously, should observe carefully its rates in previous years; these are given for 1931, 1930, and 1929, when available.

Likewise, it is important for each organization to note its standing in both frequency and severity. Records are ranked in both rates. A good standing in frequency does not necessarily mean a low severity rate. In the shipbuilding and repair group, for example, an organization with a very low frequency rate ranked near the bottom in severity.

Frequency Rates

1931-22.81	
1930-28.04	

Severity Rates

1931-2.63	
1930-2.51	

A graphical comparison of the frequency rate and of the severity rate for the years 1931 and 1930 covering thirty-six units reporting in the marine industry.

Units in various divisions of the industry made outstanding records in 1931. Some of these have consented to permit the use of their names.

Credit for the best No-Accident record in any division goes to the stevedores of the Atlantic Coast Line Railroad Company at Norfolk, Virginia. These men worked 267,000 man hours without a lost-time injury.

The United States Navy Yard at Mare Island, California, made the lowest Frequency and Severity rates in large ship building and repair units; these were 6.81 and 0.20 in comparison with 22.69 and 2.40 the average rates for all units of similar size. Among the smaller plants of this classification, the Baltimore Plant of the Bethlehem Shipbuilding Corporation, Ltd., had a Frequency rate of 9.98 against an average rate for similar plants of 41.76. Unfortunately, one permanent disability accident spoiled an otherwise good Severity rate for this plant.

The Union Oil Company of California had the best Frequency rate and the Sinclair Refining Company had the best Severity rate among tanker fleets.

Insurance Notes

Marine Department of the Scandinavian Insurance Company, Copenhagen, reports a net loss of 508,992 Kr. for 1931, as against a net loss of 743,920 Kr. for 1930.

Norwegian motor vessel Moldanger under construction at Nederland Shipbuilding Company, Amsterdam, for Westfal-Larsen and Company, Bergen, was recently gutted by fire which broke out in a freezing chamber. Moldanger of 7500 tons gross was insured while building on a value rising to 1,800,000 florins when completed.

Charles R. Page, vice-president, Fireman's Fund group of fire and casualty companies, returned to San Francisco recently, after an extended business trip, during the course of which Mr. Page made a hurried trip to London where he conferred with European representatives. Mr. Page made the return trip from New York to San Francisco by airplane.

Voluntary assumption of risk by a seaman when not acting under orders of a superior officer is a valid defense under the Jones Act against claims for injuries sustained, according to decision in Holm vs. Cities Service Transportation Co., C.C.A2 July 18, 1932.

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Diesel Engine Operation

II. The Fuel Supply

By H. A. Shawk

Chief Lubricating Engineer, Associated Oil Company

INSPECTION of fuel lines should be thorough. The main and day supply tanks should be examined and all connections and fittings inspected for leaks; the pumps should be tried out and in working order. Change over or duplicate sets should be warmed up and ready for an emergency. If the engine is provided with a tank for light oil for starting purposes, same should be filled and made ready.

All fuel oil requires filtration before being introduced in the nozzles, and the strainers and filters require frequent inspection and cleaning. The main strainers in the fuel line should be cleaned at least every day and the filters at the engine should be changed over to the duplicate set each watch. The engineer should clean the filter for his relief and assemble it ready for service.

Main tanks should be watched carefully for accumulation of water. Drains should be provided to free the sumps of excess moisture. All fuel oils throw down a residuum and in time this becomes a menace; therefore, it is well to clean tanks whenever the opportunity arises.

When all strainers, screens, filters, and lines are known to be free and in working order the fuel injection pumps should be primed and any entrained air should be expelled. The lines to the nozzles should be filled by the hand gear until fuel is at the nozzles. Try-cocks should be provided for this purpose; if not the joint should be broken.

When air is entrained the hand pump will cushion, when air is expelled the pump will operate with constant pressure, but only by great effort. Do not inject too much fuel into the cylinders while priming the lines. You may find it necessary to prime the fuel supply pump after a long shut down and, of course, when starting up a new job. This is accomplished by filling the line by hand through the priming cap until the pipe stands full. Be careful that no air leaks are present in your suction line. Everything should be inspected and screwed up tight.

Next, inspect the auxiliary pump. The plunger should work free and the packing should be in first-class condition.

Fuel nozzles should be inspected frequently. Carbon is sure to form on the tips, causing poor atomization and combustion. Spare nozzles should be on hand and stored in a receptacle filled with kerosene.

The choice of a fuel oil is of utmost importance. Some fuel oils contain sand and other foreign matter; oftentimes jelly like substances form in the sump tanks and on the screens which cause the engineer trouble. Fuels of low gravity require preheating and are not desirable for diesel engine operation.

Specifications on Associated diesel fuel which has enjoyed great popularity afloat and ashore are as follows:

Gravity A.P.I.	27.31
Flash P.M.C.C.	150 F. Min.
B.S. and M.	0.5 Max
Sulphur	1.0 Max
Vis. Say. Univ. at 32 F.	200
Ash	0.1%
Specific Gravity	.852
B.T.U.	19,300
I.B.P.	392 F.
E.P.	730 F.
Recovery	98%

A good clean fuel oil of high thermal value and low content of injurious chemical elements such as sulphur is essential for the efficient and economical functioning of any diesel engine. Given such a fuel to work with, it is further essential that the engineer in charge keep in clean, tight, workable condition all fuel tanks, fuel lines, fuel pumps, fuel strainers, fuel manifolds, and fuel nozzles.

FREIGHTS, CHARTERS, SALES

August 13, 1932

The following steamers have been fixed with grain to U.K.: British steamer Dalcarn, Portland to U.K. Cont., Bordeaux Hamburg Range, 22nd, August, Kerr, Gifford & Co.; British steamer Mabriton, Vancouver, B. C. to London, September, Dale & Co.; British steamer Orangemoor, Portland to U.K. Cont., 22nd, August.

The following time charters have been reported: Norwegian motorship Skramstad, 1 trip, delivery British Columbia, redelivery U. K. Cont., Bordeaux Hamburg Range, August, Canadian Transport Co.; Swedish motorship Oxelosund, 1 trip, delivery British Columbia, redelivery U.K. Cont., Bordeaux Hamburg Range, August, Canadian Transport Co.; American steamer S. A. Perkins, 2 round trips, Pacific Coast to Gulf of Mexico, bare boat, August, Gulf Pacific Line.

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Trade Notes

Machine Tool Distributors Appointed.—R. W. Giddings Supply Company, 531 Howard Street, San Francisco, has been appointed distributors in the San Francisco territory for the National Twist Drill & Tool Co. of Detroit, manufacturer of high speed and carbon twist drills, reamers, milling cutters, countersinks, arbors, and special tools.

Associated with the Giddings company to handle this line is Ted Rohrer, formerly of the Pacific Tool & Supply Co.

The R. W. Giddings Supply Company handles other high quality lines, such as the D. T. Williams Valve Co.'s reverse valves, regrindable valves, oil and grease cups, and steam specialties; The H. W. Johns-Manville Corp. asbestos packings, high temperature cements, insulating materials; The Grabler Mfg. Co. black and galvanized Square G pipe fittings. In addition a large stock of general hardware and shop supplies is carried.

B & W Tube Company Distributor.—A. M. Castle & Company has been appointed the distributor of The Babcock & Wilcox Tube Company's products in the Chicago and Pacific Coast territories.

This company is the only distributor representing The Babcock & Wilcox Tube Company in the Chicago district and is the exclusive distributor and sales agent for B & W Tubes on the Pacific Coast, where A. M. Castle & Company maintains warehouses at San Francisco, Los Angeles, and Seattle; with the exception that C. C. Moore & Company, agents for The Babcock & Wilcox Company, will continue to sell and service retubing jobs for B & W and Stirling Boilers.

A. M. Castle & Company will carry in its Chicago and Pacific Coast warehouses adequate stocks of B & W Tube Company Boiler Tubes and any other classes of tubes for which there may be demand for out-of-stock shipments. In addition, A. M. Castle & Company will sell for mill shipment all the B & W Tube Company Products, which include a full range of cold drawn and hot finished seamless tubes and pipe in sizes ranging from 1/2 inch to 8-5/8 inches outside diameter made to any commercial analysis.

The Babcock & Wilcox Tube Company has supplied boiler tubes for B & W and Stirling boilers for many years, some of the later applications being for pressure service as high as 3500 pounds per square inch.

Radio Installation.—Announcement that the Merchants and Miners Transportation Company had placed a contract for the equipping of six more vessels of that company's fleet with RCA radio direction finders was made recently by C. J. Pannill, executive vice-president of the Radiomarine Corporation of America. Installation of the equipment is now proceeding on the steamships Volusia, Wyoming, Providence, York, Essex, and Lake Glasco. When the work has been completed, all the vessels of this company will be equipped with RCA direction finders, and all of their radiotelegraph equipment will be serviced by the Radiomarine Corporation of America.

Sperry Gear.—In addition to the seven new U. S. Coast Guard patrol boats of the Thetis type, two more of these 165-footers will be equipped with the Sperry Gyroscope Company's new electro-mechanical steering system.

This system, to be installed on the Argo and Galatea which are now building at the John H. Mathis Company, Camden, New Jersey, is a recent development in steering systems for vessels of intermediate size. It combines all the reliability of manually operated gear with the convenience and ease of operation of electric system. The steering wheel is always mechanically connected to the rudder, and in case of power failure the motor automatically disconnects from the system, allowing the helmsman to continue steering with the same wheel and shafting without declutching or throwing switches.

Berry Dunn Represents Frick Line.—Frick Company of Wavnesboro, Pennsylvania, manufacturer of refrigeration machinery, announces the appointment of Berry E. Dunn as Western sales and service representative for the marine field. Offices have been opened at 420 Market Street, San Francisco.

Refrigeration line of the Frick Company includes ammonia and carbon dioxide refrigeration ma-

chinery both in single-acting and dual effect.

Berry E. Dunn also represents the Kearfott Engineering Company as in the past, this line embracing Lockwood & Carlisle genuine English piston rings, Kearfott windows, and Beclewat windows.

Transferred to Seattle. J. H. du Feu, well known in California shipping circles, has been transferred from the passenger staff of the Roosevelt-I.M.M. Company at San Francisco to the company's passenger headquarters for the Northwest at Seattle. He will have the title of assistant general passenger agent under G. Hazen Nickerson, Northwestern passenger manager. Du Feu will be traveling passenger agent for the company in Washington, Idaho, and Montana, and for the American-flag services in British Columbia. He has been with the I.M.M. since 1927, but has seen many years of service at sea and in shore service for various companies in Canada, the West Indies, and even as a mine sweeper in the late war in the Gulf of Smyrna and the Dover Patrol.

New Offices.—King-Knight Company, manufacturers representatives and engineering service firm in the northern California field of marine and stationary engineering, has moved its office to 55 New Montgomery Street, San Francisco. This firm has been associated for many years with the marine and oil industries and includes some of the best known lines of engines, pumps, and other machinery in its list of products it represents. Among these are Skinner Engine Company, Sterling Engine Company, Electric Boat Company, Superior Engine Company, Hill Diesel engines, Kinney Manufacturing Company. The organization is headed by Remi C. Knight and Lyman S. King.

General Electric Briefs. G-E announces the retirement of C. B. Johnson as superintendent of the General Electric Service Shop, 340 First Street, San Francisco. E. F. Hurlburt succeeds Johnson following several years in the General Electric shops and engineering divisions.

R. F. Monges, engineer of the San Francisco district for General Electric Company, has also retired. W. C. Smith, assistant engineer of the San Francisco office succeeds Monges.

Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER

San Francisco Steamship Golf Tournament. The fourth annual San Francisco Steamship Golf Tournament was held on July 22 at the California Golf Club, Baden, and in spite of cries of distress from Steamship Row, some sixty hardy sons of the sea ventured into the fog and wind of this typical July day to have a little sport and little fun. The winner of the Handicap play was James E. (Jimmy) Lowden, who turned in a low net of 77. He wins the right to have his name engraved on the Perpetual Trophy for the handicap winner, all classes. Three other names now appear on this cup, those of A. C. McLaughlin, Wm. J. Edwards, and H. J. Anderson. None of these made a strong bid for a second-time win at the tournament. A banquet was held at the club-house in the evening at which the prize winners were presented with trophies.

The committee in charge of the golf arrangements, headed by W. C. Empey are to be congratulated on staging one of the most enjoyable tournaments held by the shipping fraternity. The participants were entertained at the banquet by the presentation of "unofficial" prizes for various distinctions.

Among the guests were two well known and popular shipping men from San Pedro—Edwin J. Hannay, manager of the Bethlehem Shipbuilding Corporation, San Pedro Works, and F. E. Coyle, with the Associated Oil Company.

The winners of the handicap play are as follows:

Low Net (all classes) winner of tournament	J. E. Lowden	88-17-71
Low gross (all classes)	Thos. Cuffe	84
Class A: (Handicap 1 to 19)		
Low net	David C. Young	94-18-76
Runner up	John T. Greany	95-18-77
Class B (Handicaps 20 to 27):		
Low net	C. C. Mallory	103-27-76
Runner up	Wm. J. Edwards	104-27-77
Guest flight:		
Low net	F. E. Coyle	92-18-74
Runner up	Ben Gubser	91-16-75
Winners of special prizes were:		
High net	Thos. Crowley	111-18-93
High gross	F. A. Roller	126
High score on 15th hole	E. R. Parker	11
Worst looking set of golf clubs	Capt. Leb Curtis	
Other special prize awards were to Wm. C. Empey and Capt. T. A. Ensor.		



James E. Lowden, ship broker, and winner of the 1932 San Francisco Steamship Handicap Golf Tournament.

Following is a list of the participants in the 1932 golf tournament.

Name	Gross	Handicap	Net
W. J. Edwards	104	27	77
Wm. C. Empey	98	15	83
Capt. Leb Curtis	107	24	83
H. J. Anderson	103	16	87
C. C. Mallory	103	27	76
J. H. Farmer	106	24	82
Walter Schroeder	118	27	91
Lincoln Wilson	85	7	78
Thos. B. Forster	100	20	80
Oliver Langton	110	20	90

Edwin J. Hannay	97	14	83
John T. Greany	95	18	77
Zac T. George	100	19	81
D. H. Duncanson	92	15	77
L. K. Siverson	94	16	78
Col. Chas. A. Meals	99	16	83
C. M. Le Count	108	18	90
Jas. H. Young	100	20	80
G. E. Buck	113	27	86
M. C. Darr	106	25	81
E. R. Parker	116	27	89
R. W. Bybee	113	22	81
Capt. T. A. Ensor	100	16	84
Leo E. Archer	121	21	97
Capt. W. J. Gray, Jr.	93	14	79
Geo. B. Schirmer	88	8	80
A. S. Gunn	107	22	85
J. H. Du Feu	113	24	89
F. A. Roller	126	27	99
Geo. D. Zeh	102	21	81
H. B. Haney	102	21	81
W. P. Hugo	92	11	81
F. E. Coyle	92	18	74
M. B. Woodson	104	14	90
G. S. Mack	95	12	83
W. J. Wilson	114	27	87
David C. Young	94	18	76
Ed. J. Zappettini	125	27	98
O. P. Cottrell	102	18	84
J. A. Matthews	98	16	82
Harvey M. Huff	104	12	92
J. Scott Rider	119	27	92
Thos. Crowley	111	18	93
J. E. Lowden	88	17	71
J. C. McDonald	97	18	79
R. S. Thompson	116	26	94
Thos. Cuffe	84	5	79
Irving Lyons	91	14	77
J. C. Strittmatter	92	14	78
H. T. Haviside	112	26	86
B. L. Haviside	87	10	77
Harold Mansfield	101	16	85
L. H. Cloud	87	10	77
Joe Schirmer	100	15	85
Fred Kobely	106	22	84
Moynahan	109	19	90
S. J. Sherwood	100	22	78
H. E. Van Horn	99	14	85
Phil Coxon	105	24	81
Ben Gubser	91	16	75

PACIFIC COAST PROMOTION

Mr. Joseph J. Tynan has just returned from the East and is very much elated with his promotion.

He is now vice-president of Bethlehem Steel Corporation, which is the parent company of Bethlehem, future of all of Bethlehem's interests on the Pacific Coast, in which he is vitally interested



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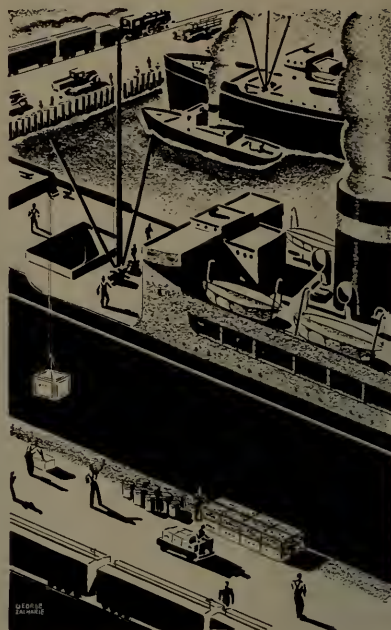
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Engineer Expert in U. S. Service
James A. Thomson, ships, and shipping. A synonymous triumvirate!

Superintending Engineer of the United States Army Transport Service, Thomson has directed \$3,000,000 worth of marine work from his San Francisco office in the past five years.

Born in Glasgow, he served apprenticeship at the yard of Alexander Stephen & Sons, engineers and builders of famous ships, and was early as well with D.&W. Henderson & Company. Thomson launched forth in naval architecture and engineering at Glasgow University and at the Glasgow and the West of Scotland Technical College.

In '92 he came to the United States. He had thirteen and a half years in yacht design in New York, associated with J. Beavor-Webb, designer of J. Pierpont Morgan's Corsair and the America Cup challengers Genesta and Galatea.

James Thomson today is in his twenty-fifth year as naval architect and marine engineer in the United States Government service; the first five years were devoted to designing mine planters, harbor boats, ferry boats, the cable ship Joseph Henry, the army transport Merritt (built in Shanghai in 1912).

After service in China, the Philippines, and other foreign stations, Thomson was sent to San Francisco and served as assistant superintending engineer during the period 1914 to 1917, when he was promoted to superintending engineer.

Fifteen years to date Mr. Thomson has been superintending engineer at San Francisco, Newport News, Seattle, Baltimore, and Chicago. From his headquarters at Fort Mason, on the Bay of San Francisco, he has been in charge of vast work during the past five years on the transports U. S. Grant, St. Mihiel, Meigs, and ex-Cambrai and ex-Somme. Also under his able wing come the United States Harbor Boats, tug Slocum, and the water tenders El Aquario and El Aquador.

"Electric-minded." The Pacific Coast takes the turbo-electrical powered ship as a matter of course now, having had ample opportunity to judge its success in the passenger trade. First came the three vessels of the Panama-Pacific Line—then the Dollar liners President Hoover and President Coolidge. The latest additions to this growing "electric ship" fleet are the three passenger and refrigerated cargo



With twenty-five years government service behind him as naval architect and marine engineer, James A. Thomson fills the important position of superintending engineer for U. S. Army Transports at San Francisco.

liners of the United Fruit Company. However, it is from the men operating these power plants that we must take the last word as to their success. First Assistant Chief Engineer H. Talbot of the Chiriqui does not mind admitting that he is "sold" on the turbo-electric drive. Talbot, affectionally known as "The Worst Assistant," virtually grew up with the Chiriqui, having been assigned to stand-by while the vessel was building and outfitting at the plant of the Newport News Shipbuilding & Drydock Company. While having seen service on the East Coast, Talbot is well known on the West Coast. He was chief engineer for some time on the Dol-



H. Talbot, popular first assistant engineer of the steamship Chiriqui who is taking the place of Chief Edwin H. Thomas during the latter's vacation.

lar round the world liner President Polk and has served with the inter-coastal Isthmian Line, steamship Robin Hood, and with the Admiral Line coastwise. He also saw brief service with the American South African Line. Worst Assistant Talbot is never recognized by his friends unless he is properly dressed up with his ever-present "taggy."

It's a Boy.—As another more illustrious columnist would say "It's a boy at the Paul C. Von Gontards!"

As we go to press, the good news reaches us that another Native Son has registered-in at the Port of San Francisco. The proud father—and aren't we all, with the first-born?—has a host of friends in Pacific maritime circles where he represents the Busch Sulzer Bros. Diesel Engine Company.

A long and successful voyage to you, Junior! Your parents showed good judgment in selecting as your birth place the "City by the Golden Gate."

Manhattan Officers. When the new de luxe steamship Manhattan of the United States Lines sailed on her maiden voyage from New York to Europe on August 10, she was officered by a fine list of tried and true ship officers and personnel. The world famous George Fried is the vessel's commander, and John B. Morris is chief engineer.

Captain Fried is well known as the skipper of the steamship President Harding and President Roosevelt and the heroic rescues by his men. Chief John Morris has been in the service of the United States Lines for the past eight years and was formerly chief of the President Harding and President Roosevelt and staff chief of the Leviathan.

Other officers include: Robert J. Sullivan, chief officer, formerly on the steamships Virginia and California of the Panama-Pacific Line; Anthony Koppenjan, purser, has been in the company's service since 1921 and was purser of the President Roosevelt, President Harding, George Washington, and America; John H. King, chief steward, senior steward of the line, joined the company in 1920 as chief steward of the President Harding, also serving in the same position on the President Adams, President Fillmore, and Republic; Wm. J. Gibson, second steward, for several years chief steward of the Leviathan and later employed in a similar capacity on the White Star liner Olympic; S. W. Fenton, chief radio operator



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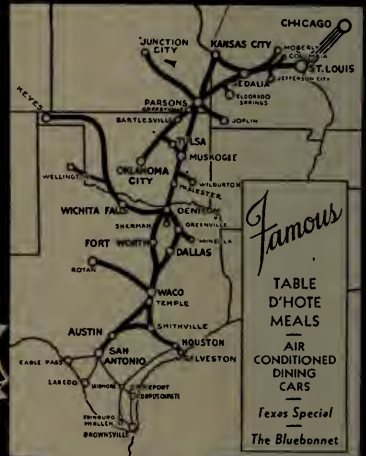
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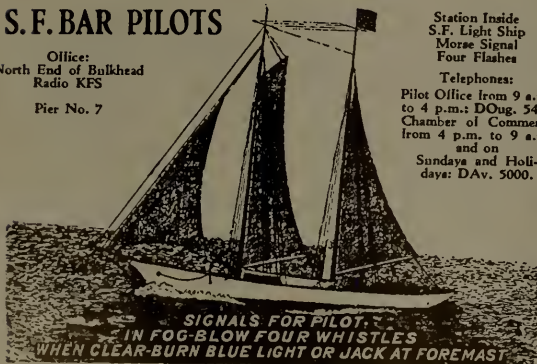
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Summer is still with us and Indian Summer is out ahead. Nevertheless, vacation days are officially over for the Propeller Club of California... and the bigger and better season has started with stimulated activity, with the first program staged Tuesday, August 16.

This first event, planned to attract a record attendance, rang the bell!

A miniature Fanchon and Marco revue was staged, and the big audience enjoyed it to the limit. This occasion witnessed a general reunion of Propellerians who turned out to see the new season launched as auspiciously as possible... and it is quite evident that members are glad to "be aboard" on the good ship again after her few weeks in dry-dock.

The Lunch Room and Program Committee is making elaborate plans for subsequent events with Harry Haviside, Albert Porter, Vernon Showell, Frank De Pue, Bernard DeRochie, and Chairman H. J. Anderson again swinging into line with renewed enthusiasm.

The schedule of programs is an ambitious one, with leading authorities on maritime subjects listed for interesting and instructive talks. This well diversified schedule of events promises to merit fine support in terms of big attendances.

— PC —

As we go to press, announcements are going out for the program for the luncheon meeting on August 23. Captain George S. Lapraik will be the speaker on this occasion. The skipper is billed for a talk on the good old days off the China Coast under the Pacific Mail flag. Captain Lapraik should fur-

nish us with a very interesting talk.

— PC —

The luncheon for August 30 will be held aboard the California State Nautical School Ship, by special invitation of Captain Emil Topp, head of the school and member of the Propeller Club. Plans are being prepared for transporting about 100 Propellerians who have signified their intention to make the inspection trip.

— PC —

Competitive examinations for enrollment of forty youths as students of the California Nautical School will be held on September 16 at San Francisco, Sacramento, and Los Angeles. All male residents of this state, between the ages of 17 and 21, graduates of high school, and in sound health are eligible to compete in the examinations. Captain Emil Topp, superintendent of the school, may be addressed at 215 Market Street, San Francisco; or information may be obtained from the California State Department of Education, Sacramento.

The nautical school for the training of officers for deck and engineering positions is conducted by the State Department of Education. It has its headquarters at California City on San Francisco Bay and, in conjunction with the navy department, operates the steamship California State for the training of the young men for merchant marine officers. The course is for two years and is conducted with the least possible expense to the students.

— PC —

Through the kindness of our worthy member, Bernard Hedstrom,

members may make luncheon reservations by calling DOUGLAS 2714.

— PC —

Propeller Club Convention. The Propeller Club of the United States will hold its annual convention at the Cavalier Hotel, Virginia Beach, on October 16, 17, and 18, with the attendance to include 500 delegates, their relatives and friends and a number of distinguished guests representing the political, business, and maritime life of the state and nation.

Representative Edwin L. Davis, of Tennessee, will be one of the principal speakers on the program which is now in the process of arrangement. The convention program is in charge of a committee consisting of G. F. Blair, district director of the U.S. Shipping Board and president-elect of the Propeller Club of Hampton Roads; W. A. Cox, port director for Hampton Roads; and Leon Seawell, vice-president of the local club.

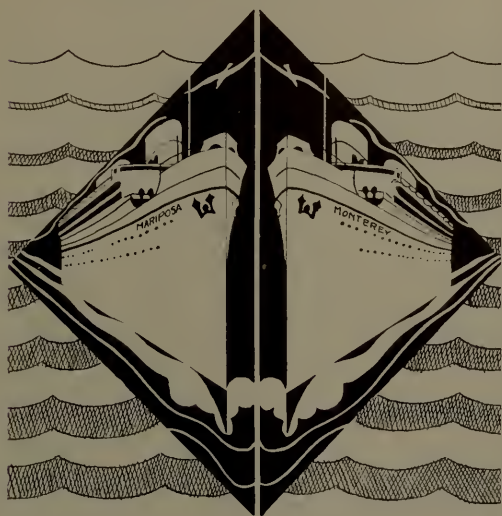
Arthur M. Tode, of New York, national president of the Propeller Clubs, will preside at the various convention business sessions. He will be assisted by the national secretary, Harold J. Harding.

— PC —

Propeller Club Elects. John Cormode was elected president of the Propeller Club of the United States, Port of Seattle, at the recent election. Cormode is well known to the shipping fraternity through his position as assistant to the president of the American Mail Line. Frank P. Foiste, manager of the Shipping Federation, was elected secretary; C. H. Carlander, general manager of the Puget Sound Freight Lines, retired as president of the club.

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More recently the Navy further endorsed McIntosh & Seymour Engines by ordering two 150-hp. units for towboats being built on the west coast.

Selection of McIntosh & Seymour Engines for introducing Diesel-electric towboat propulsion in the Navy is but another instance of Government preference where the success of an important engineering advance hinges mostly upon engine performance. Other typical examples include, the largest power allotment to any builder for the Shipping Board Motorships which made round-the-world ship service practical; installation by the Engineer Department in its four largest sea-going hopper dredges and for the first direct-Diesel pump drives on large hydraulic dredges; installation by the Coast Guard to drive the most powerful cutter in its Arctic service; installation by Inland Waterways Corporation to drive the largest river towboat in existence; installation by the Bureau of Indian Affairs to drive its finest Alaskan supply ship.

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Honor Port Builder. Nearly 200 civic leaders of Oakland and San Francisco assembled at the Oakland Airport Inn, under the leadership of the Oakland Marine Exchange recently, to do honor to George B. Hegardt, retiring Chief Engineer and Manager of the Port of Oakland, California. Mr. Hegardt came to Oakland in 1925 to take charge of the plans and construction for a \$10,000,000 port development project voted by the citizens of Oakland. That he has succeeded not only in developing the very highest type of port facilities for the needs of this city, but also in bringing cargoes and industries to the port are facts well known to all who have any contact with shipping affairs. In paying tribute to Mr. Hegardt, Ralph Fisher, president of the Port Commission named him—"eminent engineer, able administrator, and faithful friend." One of Hegardt's greatest accomplishments in his career as builder of ports is the fine modern harbor at Portland, Oregon, which was developed under his able supervision and design. In seeking retirement, Hegardt gave as his reason the desire to be relieved of the heavy burdens after forty years of work throughout the country on public projects.

Heads Port Authorities. J. A. Crawford, vice-president of the Los Angeles Harbor Commission, was elected president of the Association of Pacific and Far East Ports at the recent annual convention held in Seattle. The 1933 convention of the association will be held in Los Angeles, and George F. Nicholson has been elected secretary for the convention.

Well Deserved Promotion. E. H. (Gene) Hurst, who has been with the Matson interests for many years and has seen this organization grow from a small cargo and passenger business between Hawaii and San Francisco to an organization operating a de luxe express passenger and freight service from California ports to Australia and New Zealand, has been promoted to the position of assistant freight traffic manager. The announcement was made recently by M. F. Cropely, freight traffic manager. Gene's many friends in San Francisco and elsewhere will be glad to hear of this well merited recognition of his abilities.

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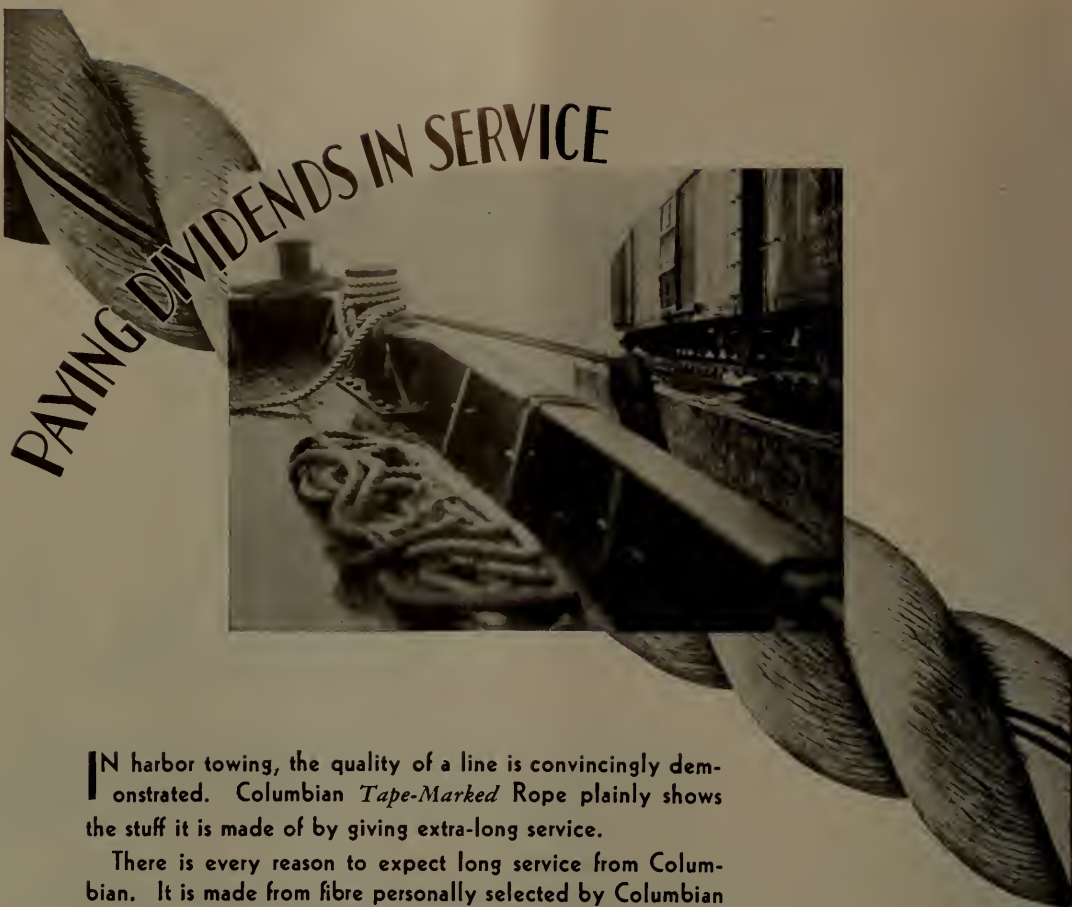
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Pacific Marine Review

OCTOBER, 1932

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WISE, ENERGETIC planning for recovery, with government credit extended for self-liquidating construction projects which will provide jobs for unemployed, now takes the place of merely waiting for the depression to end.

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Employment is the only cure for unemployment. Put the people back to work and the future will take care of itself.

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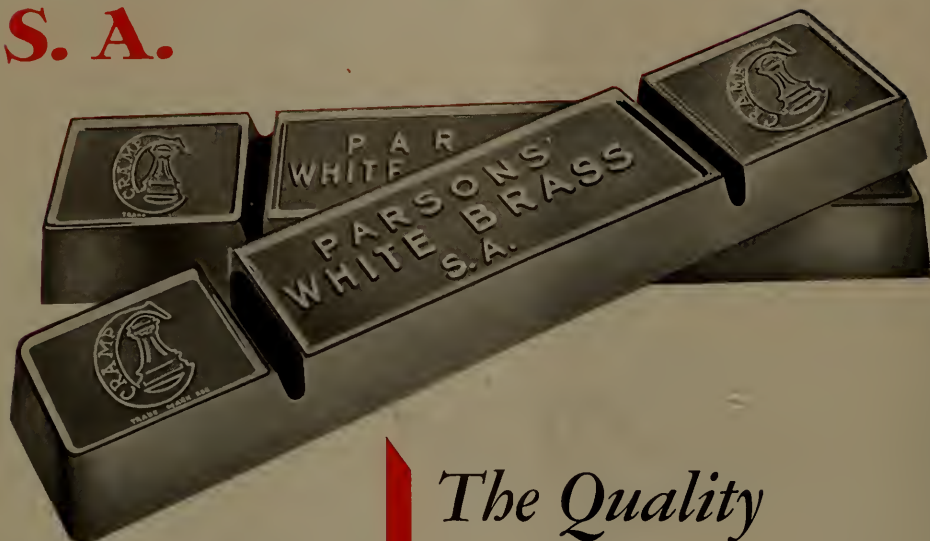
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Pacific Marine Review

The National Magazine of Shipping

VOLUME XXIX

OCTOBER, 1932

NUMBER 10

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Steamship Association*

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Vice-President and Manager

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OCTOBER, 1932

NUMBER 10

Editorial Comment » » »

Ocean Mail Contracts A National Policy

THERE seems to be much misconception in the mind of the average American citizen, and even in the minds of many ship operators, as to the purposes involved in the national policy of ocean mail contracts. In order to clearly understand the value of this policy and its justification from the national viewpoint, one must have a definite idea of all the problems involved in American foreign trade and overseas shipping. It is not within the scope of this editorial comment to cover any adequate discussion of these problems. We can, however, outline the basic facts upon which rests the case for Ocean Mail Contracts.

America's maritime commerce is divided by routes into three broad general classes; namely, coastwise, intercoastal, and foreign. Coastwise and intercoastal are confined to American-built, American-owned vessels and have no foreign vessel competition. The foreign commerce of the United States is open to competition from the ships of the world.

Careful analyses by many experts have all reached substantially the same conclusion; namely, that the American standard of wage scale (both in shipbuilding and in ship operation) makes the operation costs of any American vessel much higher than those of foreign vessels. This excess cost varies from 35 per cent. to as high as 60 per cent. This excess cost of operating an American vessel had driven the American merchant marine out of overseas cargo carrying to such an extent that at the opening of the late World War we were practically dependent on the ships of our keenest competitors for delivery of our foreign commerce.

The principal factor in this excess cost of operation is the standing charges against the higher construction costs of vessels built in American shipyards, these again being due to the high American wage scale. In order to offset this item, Congress in the Merchant Marine Laws of 1920 and 1928 included provision for favorable loans to shipowners building new tonnage for overseas trade routes. The 1928 law allows a loan of

three-quarters of the cost at an interest rate (as later amended) of $3\frac{1}{2}$ per cent minimum. The customary standing charge based on 6 per cent. interest is 15 per cent., including interest, depreciation, and insurance. With a $3\frac{1}{2}$ per cent loan, then, on three quarters of the cost of an \$8,000,000 vessel, the American shipowner would have to provide 15 per cent on \$2,000,000, plus $12\frac{1}{2}$ per cent on \$6,000,000, or \$1,050,000 per annum. The same ship would cost a European shipowner about \$5,000,000; and even assuming that he had to pay 6 per cent for all of his money and got no assistance from his own government, his 15 per cent standing charge would total \$750,000, or \$300,000 less per annum than that of the corresponding American owner. However, notwithstanding these lower costs, many European governments are making almost as favorable loans to their shipowners as is the American government to the American shipowner.

Now it is largely to offset the advantage of the foreign competitor on this standing charge, plus the additional advantage of lower crew wages and sustenance that the 1928 law includes an additional aid to the American shipowner in the form of mail contracts.

Knowing that fast ships of large carrying capacity for both passengers and cargo are great assets as naval and military auxiliaries—are great builders of foreign and domestic commerce—and are useful for transport of mail, the framers of this law based compensation on a tonnage, speed, mileage basis and on the building of new and improved vessels whose specifications would meet the approval of both Shipping Board and Navy experts.

There are built or building under the terms of this law, 31 new vessels of 371,000 gross tons, costing \$138,000,000. There are reconditioned or in process thereof, 15 vessels of 132,000 gross tons at a cost of nearly \$12,000,000. Including the above, the terms of existing mail contracts contemplate construction of 60 new ships and with 53 additional ships, construction of which is contingent on certain conditions.

In order to obtain an ocean mail contract under the law, it is necessary to prove to the Interdepartmental Committee on Ocean Mail Contracts that the route is an essential trade route. This committee is composed of the Postmaster General, the Secretary of Commerce, the Secretary of the Navy, and the Chairman of the Shipping Board. Subcommittees of experts have studied every route to determine as nearly as possible the exact difference in construction and operation costs between new American ships and foreign flag ships on that route. In the great majority of cases the compensation established under the ocean mail contracts has not been sufficient to equalize the handicap against the American operator. This is shown by the steady inroads of foreign competitors, particularly from low

wage scale countries like Norway, Italy, Germany, France, and Japan.

At the present time the federal treasury is putting about \$16,000,000 a year into ocean mail contracts, over and above what the transport of ocean mail would cost on a poundage basis. This constitutes the only United States subsidy to its commercial overseas merchant marine. Comparatively poor and small nations like Italy are paying subsidies totaling more than twice that amount.

United States ocean mail contracts are on a flat rate for a 10-year period. Should the increase in volume of mail and parcel post shipments approximate, during the next ten years, the same rate that it has maintained during the past decade, the actual compensation under these contracts will not be very much greater than the poundage rate for the then total weight of mail. And should any emergency arise when Uncle Sam needs some naval and military auxiliary vessels in a big hurry, he has first call on these fine fast ships which would then be worth many times the largest total of subsidies ever dreamed of by the wildest of American shipbuilding promoters.

Whatever the viewpoint, military, naval, commercial, these splendid ocean wagons of ours are worth while investments—we are getting them at a reasonable cost.

Suicidal Taxes Kill Business

THERE is great need in our American form of democracy for some automatic method whereby tax assessing bodies shall be promptly made to feel the results of the taxes applied. Taxes on land do in theory have this reaction, but it is so gradual that politicians are willing to take a chance on it. Financial statisticians now calculate that in twenty-five years practically all agricultural land in the United States will have been confiscated for taxes. But what politician worries about tax revenues twenty-five years hence?

In taxes on sales, the effect on single commodities is often almost instantaneous but it is not felt by the politician because usually the amount involved is only a drop in the bucket compared to the total tax revenue. A very good instance of this is the extending of domestic lubricating oil sales taxes to include engine oil and useable stores on foreign ships. This was done by a court decision which classed these items as domestic sales and not foreign trade.

Now, certain oil companies on the Pacific Coast had built up a very good business selling lubricating oils to foreign motorships. Competition from foreign refineries was keen and these Pacific Coast oil concerns, while more than able to meet quality, were barely able to make a profit and meet price. This court decision imposing a tax on these sales of lubricating oil wipes out all profit and forces the Pacific Coast oil refineries to give up this business or to continue it at a loss.

Since many court decisions have declared an American merchant ship wherever located to be American territory, it would seem that a foreign flag ship in an American harbor must be foreign territory and all sales made to that vessel be foreign trade. Be that as it may, unless an exception is made, the Pacific Coast sales of lubricants to foreign flag vessels will soon be only a matter of filling an occasional emergency shortage.

Foreign Bottoms "Other than British"

FOR years our spellbinders in Congress, when tuned in on the "American Merchant Marine in Foreign Trade" have been accustomed to speak of the British Merchant Marine as our great competitor. Actuated, no doubt, by the same conception, the United States Shipping Board Bureau of Research, in making up forms for tonnage reports on foreign trade, divide the tonnage under four columns; namely, "United States Shipping Board," "Independent American," "British," and "Others." This latter classification was first made for the year 1923.

IMPORTS AND EXPORTS (COMBINED)	TOTAL				
	TOTAL	American		Foreign	
		U.S.S.B.	Ind.Amer.	British	Others
1921	81,824,834	12,164,691	29,947,604	*	39,812,539
1922	87,183,756	11,913,440	32,869,597	*	42,400,711
1923	92,375,652	9,934,455	29,038,197	28,042,520	25,360,476
1924	93,160,418	9,326,226	31,283,365	27,273,087	25,277,740
1925	92,801,653	7,908,928	29,022,390	27,971,809	27,898,526
1926	112,825,756	8,478,630	29,748,605	38,970,734	35,627,787
1927	99,118,432	8,380,218	31,772,936	30,056,218	28,909,000
1928	106,224,826	7,133,492	36,341,263	31,738,641	31,011,430
1929	108,460,581	6,441,501	36,710,975	32,797,941	32,510,164
1930	97,293,286	4,664,195	35,071,963	27,661,268	29,895,860
1931	75,913,532	3,690,518	24,491,940	20,806,260	26,924,814

Table No. 1 herewith, shows the figures for combined exports and imports. It will be noted that the column "Others" shows greater percentage of increases and less percentage of decreases than any of the four. This is particularly noticeable in the past two years.

IMPORTS AND EXPORTS (COMBINED)	TOTAL--ALL DISTRICTS				
	TOTAL	American		Foreign	
		U.S.S.B.	Ind.Amer.	British	Others
MONTHS AND QUARTERS					
July	7,164,748	319,966	2,174,721	2,314,429	2,355,632
August	7,024,688	305,276	2,229,946	2,220,519	2,268,947
September	6,827,065	308,165	2,073,320	2,005,782	2,439,798
Total for Quarter	21,016,501	933,407	6,477,987	6,540,730	7,064,377
October	7,150,594	313,988	2,306,430	2,111,584	2,418,492
November	6,309,158	237,271	2,277,968	1,647,098	2,146,821
December	5,012,133	211,186	1,621,397	1,242,985	1,936,575
Total for Quarter	18,471,885	762,445	6,205,785	5,001,767	6,501,888
January	4,545,956	169,168	1,411,664	975,345	1,989,799
February	4,919,988	232,297	1,469,213	994,176	2,224,302
March	5,273,355	255,726	1,906,782	1,126,065	1,984,782
Total for Quarter	14,739,299	677,991	4,807,659	3,095,586	6,158,063
GRAND TOTAL	54,227,685	2,373,843	17,491,431	14,638,083	19,724,328

Table No. 2 shows the figures for the first three quarters of the fiscal year 1932. Here, again, the column "Others" shows a marked gain in percentage carried.

For this nine months period, the figures for imports and exports of the Pacific Coast show a total of 8,475,241 tons, divided into: 14,278 tons for Shipping Board vessels; 2,371,697 tons for privately owned American vessels; 2,044,426 tons for British vessels; and 4,044,840 tons for foreign vessels "Other than British." These figures include petroleum and lumber shipments.

Certainly it would seem that on the Pacific Coast the chief competitors of the American merchant marine are "Other than British." Has "twisting the lion's tail" become such an ingrained habit that we are willing to let "Others" take 50 per cent of our tonnage while we compete with our British cousins over the remainder? The type of fast motor cargo ships that Japan and the Continental European nations have been putting into Pacific Coast trade routes for the past few years are very stiff competitors, and the Pacific American steamship owner is seeing more of them in his home harbors every month.

The Reorganized Shipping Board

PRESIDENT HOOVER, on July 30, appointed the new United States Shipping Board, as provided for in the Economy Act, by naming three of the old Board. Those appointed were chairman T. V. O'Connor of New York, Samuel S. Sandberg of California, and Hutch I. Cone of Florida. In addition to these three, the former Board included Albert H. Denton of Kansas, Jefferson Meyers of Oregon, R. H. Smith of Louisiana, and E. C. Plummer of New Hampshire (recently deceased).

President Hoover is to be congratulated on this reorganization and on his wise choice of commissioners. The three named represent the best marine experience on the former board. Particularly gratifying is the choice again of T. V. O'Connor for chairman, especially after the recent attempt by certain factions in the United States Senate to besmirch the character of this efficient public servant.

Immediately following its appointment by the President, the new Board took steps to make corresponding changes in its administrative bureaus and personnel. Bureaus are reduced from seven to four and the name of the Bureau of Operations is changed to Bureau of Marine Development.

Under the new set-up, T. V. O'Connor, chairman of the Board, will have supervision over the Bureau of Marine Development, the General Counsel, and the secretary of the Board. Commissioner Sandberg will have supervision over the Bureau of Regulation and Traffic and the Bureau of Research. Commissioner Cone will be in charge of the Bureau of Construction and Finance. This will consolidate the Bureau of Law with the General Counsel's office, the Bureau of Traffic with the Bureau of Regulation, and the Bureau of Finance with the Bureau of Construction.

No member of the new Board is to hold office under the Fleet Corporation.

Pacific Coast Maritime Leader

SPONSORED by the San Francisco Junior Chamber of Commerce, the Harbor Day celebration in San Francisco and on San Francisco Bay is fast becoming a symbol of State wide interest in maritime affairs. The shore-side parade of harbor day is bringing together each year more numerous and more notable evidence of the interest taken in shipping by California's many prosperous interior communities.

For the first three Harbor Day parades, the baton of Grand Marshall was held by the revered and honored Dean of Pacific Coast Shipping, the late Robert Dollar. This year the committee, by unanimous acclaim, named Roger D. Lapham as successor to this honor.

This appointment will meet with the heartiest approval from all ship operators and friends of shipping on the Pacific Coast. Roger Lapham epitomizes in his ancestry and in his career the entire history of American shipping. As President of the American-Hawaiian Steamship Company, he manages the operation of one of the largest fleets of American steamships in

the intercoastal and overseas cargo trades. This corporation and its predecessors are and have been constructive builders of marine business at the Port of San Francisco since early pioneer days.

Roger Lapham is a careful, industrial expert executive. He has built up an organization that is recognized as outstandingly successful among American steamship operators. He is an ardent golf enthusiast, a square shooter, a good citizen. The Harbor Day Parade committee is to be congratulated on its wise choice—no fitter selection could have been made.

The Old Sea Tramp

A grimy, old freighter cased up to the piers
And her sides were all battered and bent
Her plates were disfigured by many a scar
And many a lingering dent

Her discolored decks were all covered with stains,
And her winches were reeking with rust
Her crew didn't waste either muscle or brains
To polish—except what they must

Hard usage had marked her with many a scar,
She was worn by the wind and the weather
Her Master was likewise a grizzled old tar
For they'd battled the tempest together

His hide was all tanned a mahogany hue
But his life was wrapped up in his ship
For many a hazardous voyage they knew
And many a perilous trip.

Said he, "I have sailed on this dingy old scow
Through many a dangerous sea
She may not be beautiful—That I'll allow,
But she always looks handsome to me.

"I've stood on the bridge of this faithful old tub,
With a cargo of dread T.N.T.
And we came within range of a German sub,
But escaped in the reek of the sea

"We hit a typhoon off the coast of Japan,
And we bucked it for seven days straight,
We won our way through without loss of a man,
Tho' it sprung every rivet and plate

"With a cargo of hemp that caught fire in the hold,
We sailed the Pacific for days,
And the grief of that voyage will never be told
As we fought with the smoldering blaze

"The sides were beginning to buckle and swell,
And we figured our time getting short,
The decks were as hot as the hinges of Hell,
When we finally made it to port

"We were raked by a Limey just out of Hong Kong
But the old hulk still held to her luck
Her framework was solid and trusty and strong
And we saved her by promptness and pluck

"She may be a common old freighter to you,
But to me, she's the pride of my heart
She's always been steadfast and faithful and true,
No power can pry us apart"

L'ENVOI

Oh we laugh in the teeth of the burrows' dark doubt
And his fury we sanely brave
While the Storm God is shrieking as frenzied doubt
As he rides on the breast of the wave

A typical "Tramp" of the common tramp
In desperate danger we revel
We sail wide and free o'er the breast of the sea
And we fear neither Man, God, nor Devil

JOHN MCGRATH

Unique Introduction to a New Passenger Liner



Leo E. Archer, Pacific Coast
Passenger Traffic Manager for
the I.M.M.

WHEN the reorganized United States Lines faced the problem of selling their large new passenger capacity to the American public, they realized that one of the first and most important steps in the selling campaign would be the introduction of their new liner Manhattan to their American passenger agents. After considerable study it was decided by the executives of the United States Lines and of their general agents, the Roosevelt Steamship Company, that a key man would be selected from each important passenger agent office and that these men would be brought to New York for an actual cruise on the new liner Manhattan; so that there would be in each of these offices at least one man who could say, "I have traveled on this ship and therefore I know that—she is comfortable in a sea way—she has the best beds I ever slept on—her cuisine is the best—her deck spaces for games and promenade are ample—she has the finest public rooms of any vessel of her size—she has many features not found on any other transatlantic vessel."

To bring several hundred passenger agents from all parts of the United States, take care of them in New York, take them out on a special twenty-four hour cruise, and return them to their respective places of business pepped up with the idea that the Steamship Manhattan is the finest cabin liner afloat—that was the task which the executives of these two companies set for themselves at the delivery of this vessel.

A very representative group went back from the Pacific Coast, headed by L. E. Archer, Pacific Coast Passenger Traffic Manager for the International Mercantile Marine Co. Mr. Archer, on his return, was very enthusiastic over the new ship and over the wisdom of the United States Lines and the Roosevelt Steamship Company in adopting this method of introducing S. S. Manhattan.

Over seven hundred guests were taken out for a twenty-four hour cruise. Dinner, breakfast, and luncheon were served on board. While the ship cruised in the Atlantic off New York, all the guests were entertained with the same variety and class of games, dancing, and program that will be constantly available for passengers.

In the grand lounge a showing was made of the new talking picture "Congorilla," with all the finesse of a first class motion picture house. Dancing to the music of the finest dance orchestras was enjoyed both in the grand salon and in the veranda cafe and on the promenade deck.

"Great enthusiasm was displayed over some of the special features of the Manhattan," says Mr. Archer, "and especially over the symmetrical grouping of the public rooms on the promenade deck."

One innovation which brought much favorable comment was the use of full length French doors for windows in the Palm Court. By means of these doors this room, which is the forward apartment of the main group of public spaces, can be opened up on three sides onto the wide glass-enclosed promenade deck.

Another feature is the large flush area on the promenade deck just aft of the veranda cafe. This portion of the promenade deck is in way of cargo hatches Nos. 4 and 5 and in order to make possible a flush deck, the builders have introduced a novel arrangement of cargo handling machinery. The after mast supporting the cargo booms is located between the hatches. The hatch trunks, with their water-tight covers, end at A Deck, one level below the promenade deck. On A deck a winchroom is arranged between the hatches. Here are housed eight cargo winches. On the promenade deck above, the flush deck is removable over each hatch and over the winch room. The result is a flush teak deck 86 feet square clear of all obstructions except the single mast. This open air deck space is ideal for dancing or for deck games.

Perhaps the most interesting feature from the passenger viewpoint is the "conditioned air" service in dining rooms. This is new on the North Atlantic passenger ferry. No matter what may be the weather outside, or what the temperature and humidity conditions in any other part of the ship, the atmosphere in the cabin and tourist class dining rooms on the Manhattan will be ideal for comfort and for appetite. Washed, conditioned completely every 4½ minutes, the air in these two rooms will be kept at a predetermined standard by automatically controlled electric machinery.

By good fortune and good management there were in New York available for inspection at the time of Manhattan's delivery two other noted vessels of the fleet for which the International Mercantile Marine and the United States Lines are owners or agents. These were the steamship Leviathan and steamship American Merchant.

Thus the group of passenger agents had an opportunity to personally inspect and compare four ships of widely varying types of naval architecture and marine interior arrangement and decoration.

"The Manhattan lost nothing by this comparison," declares Mr. Archer. In fact, the unanimous opinion of the Pacific Coast group was "that the Manhattan is at the top of the list so far as passenger comfort is concerned." Most of these men have had an opportunity to inspect the many fine new passenger liners built in American shipyards during the past ten years. Each of these vessels has had some point of superiority, some unique claim to distinction. Reviewing in their minds the features of these vessels and granting to each its due mead of praise, the passenger agents who had the privilege of inspecting the new United States Lines liner are unanimous in their homage. After a long list of beautiful and splendid American ships—"Now the Manhattan."

World Shipping Conditions

Some Notes and Comments on Merchant Marine Affairs, with Particular Reference to Pacific Coast Shipping

COOPERATION between shipowners was the keynote of the recent meeting of the Standing Committee of the International Shipping Conference. With freights at the lowest mark in recent historical times, and with approximately 20 per cent. of the world's seagoing tonnage laid up, the bottom apparently has not been reached. Proposals for cooperative lay-up of 30 per cent. of all tonnage are being made, but the best informed ship operators are demanding that the program be not merely to lay up 30 per cent, but to scrap 30 per cent. and that, in addition, there must be combined with this scrapping program some sort of set-up for chartering dictatorship in each trade.

World prices on old tonnage have gotten so low that in several recent auction sales the vessels brought a cash price less than one-fourth the face value of the mortgages for which they were security.

Countries and organizations represented at this meeting were: Belgium, Denmark, France, Germany, Great Britain, Greece, Holland, Italy, Japan, New Zealand, Norway, Baltic, and International Maritime Conference. United States Shipping Board had a representative present as an observer. The best way of carrying out the details of this cooperative resolution is left to the national shipping organizations.

The reorganized United States Shipping Board is already acting on this scrapping suggestion and has recently advertised 124 cargo steamers out of its active list to be sold for scrap. The vessels involved range from 7500 to 12,500 tons deadweight carrying capacity, which means that when this scrapping sale shall have been consummated 1,077,243 tons deadweight capacity will have been removed from political or actual competition in the ocean cargo carrying trade.

Ocean Freights

As compiled by the Chamber of Shipping of the United Kingdom, the index number of shipping freights for June, 1932, stood at 17.10, a decrease of 12.04 per cent. as compared with May, and 9.19 per cent. lower than a year ago. Taking the average for 1913 as 100, that for June, 1932, would be 73.08.

In this connection, it is interesting to note that Lloyds figures show that more tonnage was scrapped in the last quarter of 1931 than was lost at sea. Scrapped were 74 ships totaling 253,000 gross tons; lost and condemned were 85 ships representing 95,000 gross tons. During 1931 there was a decrease in steamships of 961,604 tons; an increase in motorships of 606,944 tons; a decrease in sailing ships of 42,070 tons; and a resultant net decrease in world tonnage of 376,730 gross tons. United Kingdom, Holland, United States, and Germany showed largest decreases; Norway, Danzig, Russia, Greece, and Italy showed largest increases. World tonnage totals June, 1931, 70,131,040; June, 1932, 69,734,310.

Consideration of scrapping schemes is being actively taken up in Great Britain, although the British stand

well above the average in percentage of modern tonnage. In Great Britain and Ireland over 81 per cent. of the registered tonnage is less than 20 years old and over 20 per cent. is less than five years old. Less than 7 per cent. of the United States' registered tonnage is less than five years old.

World shipbuilding is less active than at any time in the past fifty years. As of June 30, 1932, the total commercial tonnage under construction in the world's shipyards was 1,109,773 gross, as compared with 1,824,800 gross on June 30, 1931. Nearly three times as much tonnage was launched throughout the world in the second quarter of 1932 as was represented by contracts for new ships granted during that three months.

Since the above was written there has been a decided trend toward stabilization, and some evidence of a turn upward in ocean freights. This is partly seasonal and partly due to the more optimistic outlook in world business.

British Trade

Notwithstanding the adverse tariff regulations and the unfavorable exchange situation, Great Britain is still the best foreign market for United States food stuffs, raw products, and manufactured goods. The Pacific Coast states will continue to supply Britain with large quantities of fruits (fresh, dried, and canned), canned fish, petroleum products, motion pictures, lumber and lumber products.

The report of United States Commercial Attache Meekins from the Ottawa Conference indicates the nature of the principal changes embodied in the agreements. While the full text will not be published until ratified by the various governments involved, the substance is practically as follows:

Great Britain agrees to continue free trade with the Dominions and India and colonies and protectorates as under the Import Duties Act of 1932,—to impose special import duties on designated goods from all other countries,—to not reduce without consultation and consent the present 10 per cent. ad valorem import duty on certain groups of commodities; the Dominions agree to grant new and increased preferences to Great Britain on selected groups of commodities; the Dominions agree among themselves on certain preferences on selected commodities; all agreements for five years and thereafter to terminate on six months notice.

These agreements have a world-wide scope and may if ratified, profoundly disturb world trade. They include: trade of the United Kingdom with Australia, Canada, India, Union of South Africa, Southern Rhodesia, New Zealand, and Newfoundland; trade of Canada with the Irish Free State, Southern Rhodesia, and New Zealand; and trade of the Union of South Africa with New Zealand and the Irish Free State.

New Tariff Regulations

Increases on Japanese ad valorem duties, approved on June 16, will be imperative until November 15, on

far as United States and other treaty nations are concerned. These increases apply on automobile parts, with an increase from 25 to 35 per cent. ad valorem, and on sardines in oil, natural butter, olive oil in bottles, woolen and worsted yarns, woolen piece goods, and small knitting machines, which take a surtax amounting to 35 per cent. of the specific duties.

Effective July 2, Norway increased her import duty on dried prunes from 0.27 to 0.45 crowns per net kilo and on dried apples from 0.72 to 1.08 crowns per net kilo.

On and after May 1, the Philippines Bureau of Plant Industry is requiring that all importations of fruits, vegetables, seeds, and other plant materials be accompanied by certificates of inspection issued by the proper governmental authorities of the country of origin stating that the materials are free from injurious insects and diseases.

Austria has added apples and flour to her list of restricted goods subject to import permit, effective July 15.

Effective July 30, Colombia has decreased her import duties on some classifications of iron and steel sheets, rivets, screws, nuts, and bolts to be used in Colombian mining industries to 0.005 peso per gross kilo, and has reduced the canalization tax on the same items to 5 pesos per metric ton.

Since the beginning of this year, increased import duties have become effective in French Indo-China on maize, maize flour, bags, pork, codfish, turbine parts, pipe fittings, cotton hosiery, sugar, and metal trellis work. Reductions in import duties are effective on pure silk fabrics, certain papers, and photograph parts. Exemption from import duty is granted to nonbituminous coal, road oils, soft and hard pitches, and certain ships.

No Peruvian consular invoices are required on parcel post shipments to Peru when such shipments are valued at less than five dollars. Parcel post shipments, regardless of value, are exempt from requirement to be covered by Peruvian consular invoice in cases where there is no Peruvian consular officer at the shipping point.

Tenders for a steamship service from British Columbia ports to the Orient on a subsidy basis, to aid the lumber industry in that Province, have been requested by the Minister of Trade and Commerce. The service will be from British Columbia ports on a monthly basis and tenders were returnable July 31. It is provided that wherever possible British ships shall be used and that they shall be capable of carrying from 4,000,000 to 5,000,000 feet of lumber as well as general cargo and grain, if offered. These vessels must load only at British Columbia ports as the subsidy will be provided specifically for the encouragement of export trade between the Canadian Pacific Coast and the Orient.

Italian Freighter Bounties

Italy, as of January 1, 1932, has revived the principle of bounty to general cargo tramp services and has appropriated a total of \$3,682,000 for the fiscal years 1931-1932 and 1932-1933. The basis of the subsidy paid any ship is sea performance calculated according to distance sailed, size of ship, and age of ship. Distance for which bounty may be claimed is limited, according

to certain tonnage ranges. For vessels not exceeding one year old, the scales are as follows: 1500 tons gross and under, \$0.0013 per gross ton mile, limit 30,000 miles; 1500 to 2500 gross tons \$0.00065 per gross ton mile, limit 30,000 miles; 2500 to 4000 gross tons, \$0.00004 per gross ton mile, limit 40,000 miles; and 4000 gross tons or over \$0.00001 per gross ton mile, limit 40,000 miles.

This bounty does not apply to vessels in the regular Italian contract services. These latter are organized under central control in two groups: namely, "indispensable," comprising 14 groups of 88 routes operating under 20-year contracts; and "useful," comprising some 600,000 gross tons on 20 routes under 5- and 10-year contracts.

Windjammer Revival

Interest in sailing ship navigation is chronic in all Nordic races. Normally dormant, it revives in sporadic outbreaks whenever depression in industry offers opportunity to pick up crews at favorable terms. Recently on both Pacific and Atlantic Coasts of the United States this tendency has developed to the point of giving profitable work to shipyards.

C. Nelson Rogers (some marine flavor to that moniker) of Boston is now refitting the first of two old square-riggers at the Bath Iron Works, Bath, Maine, with the intention of trading between the ports of New England and the West African Coast. His first ship, the *Coriolanus*, will load with general trading goods at Boston this fall, and the Captain will trade for raw products along the African coast until his outbound cargo is exhausted and he is loaded with produce for the home trip.

Edward Elson Grieve of Los Angeles had dreamed all his life of a sailing ship cruise through the South Sea Islands. Coming into a moderate inheritance recently, he purchased the fine old Alaska Packers' bark *Star* of England and is having her refitted at the General Engineering & Dry Dock Company, Oakland, California, advertising the idea that he will sail with a party of friends, scientists, artists, or any acceptable party that can share the expense of grub and operation; ports of call on a South Seas and round-the-world voyage to be up to the whims or necessities of the occasion.

Another reported sail venture indicates the charter of the ship *Star* of Alaska from the Alaska Packers by the Windjammer World Cruise Association of Spruce Pine, North Carolina.

Japanese Charters

During July some fifteen Japanese steamers were fitted to load full cargoes of soya bean from Far East to European continental ports, principally Rotterdam and Hamburg. This unusual chartering movement is owing to the lay-up of many of the regular liners due to quiet conditions in the normal passenger and cargo service in this trade.

Victoria, B. C., Proposed as a Free Port

A plan has been prepared for presentation at the Imperial Economic Conference at Ottawa to establish Empire free ports at strategic points in the British Dominions to facilitate the distribution of goods produced within the British Empire. The plan has been proposed by the Victoria Chamber of Commerce and that organization is endeavoring to procure the endorsement of the Dominion Government and the designation of Victoria as a free port.

Seatrains Expansion

Particulars of Two New Seatrains Building at the Sun Shipbuilding & Dry Dock Company

THE performance of Seatrain New Orleans, the original loaded freight car transport, on her New Orleans-Havana run has attracted the interested attention of the whole shipping world to a new system of cargo transport. This system places the loaded freight car in a seagoing vessel equipped to handle standard cars and unloads that car on to rails at the other end of the sea route. It thus eliminates—special packing; one loading and one discharging operation from cars; stevedoring charges and damage; pilferage; spoilage through contact with other cargo; and necessity for expensive superstructures on piers.

An article in the June issue of Pacific Marine Review described this service and also announced the building of two new seatrains at the plant of the Sun Shipbuilding & Dry Dock Company, Chester, Pennsylvania. These two vessels, named Seatrain New York and Seatrain Havana, are about ready for delivery, and full particulars of their very interesting construction and machinery are now available.

Principal characteristics are:

Length between perpendiculars.....	460'0"
Beam molded	63'6"
Depth molded, main deck, amidships	38'3"
Displacement, tons	13,745
Draft	22'8"
Dead weight, tons	8,445
Speed, knots	15½
Shaft horsepower, max.	8,800

As will be noted from the illustration, the seatrains are flush superstructured deck vessels with machinery aft. They are fitted with three complete decks, superstructure deck, main deck, and poop deck. All of these decks and the tank top carry loaded cars on rails. The total capacity is 100 standard box cars. All of these cars can be unloaded and an equal number loaded inside of ten hours.

Oil-tight bulkheads, forming side tanks, extend from the tank tops to the main deck and from the boiler room to the forepeak tank, forming a double skin around this portion of the ship. These tanks are used for fuel oil or for ballast water. They are thus useful for safety, for additional cruising radius, and for keeping the ship on an even keel when the cargo is unevenly loaded.

A feature of construction was the use of special copper bearing steel for the main and superstructure decks and of stainless steel for fittings wherever corrosion resistance is necessary. Rails are all electrically welded to decks and welding is extensively used to secure fittings throughout the ships.

One main hatch serves the ship. Four special cradles are provided on each deck level. These cradles serve as hatch strongbacks on the tank top, tween deck, superstructure deck, and as a water-tight hatch cover on the main deck. When the ship is fully loaded, each cradle has a car on it.



In the hatch of a Seatrain, showing tracks, spotted car, and reinforced construction.

Car Handling

The cars are lifted from the shore tracks aboard the vessels by means of specially designed cranes which are located on the dock at the terminal. By means of these cranes the loading and unloading of freight cars from the vessel can be done at the same time. In the loading operation, the cradle, which is fitted with tracks, is placed in a gap in shore tracks and the loaded freight car is run on the cradle. The crane then lifts the cradle, with the car upon it, up over the vessel's side and lowers it into the hold, making a connection of the cradle rails with the deck rails. A mechanical car-handling device inside the ship shunts the car from the cradle on the deck tracks. While this cradle is still in place, a car intended for unloading from the vessel is placed upon it by the car handling device. This car is then lifted on the cradle from the hold of the ship and placed upon the dock. The car is then shunted from this cradle and another car, intended for loading, takes its place and is in turn placed on the vessel.

The cars are held in place on the rails in the ship by screw jacks secured to the special jacking rails and by means of special quick-operating rail clamps. The loading crane is so arranged that it will lower the cradle over the different tracks as necessary to keep the vessel properly trimmed, and the process of loading and unloading is continued. When the four tracks on one deck have been filled, the loaded cradles are secured in place. There are no switches from one track to the other in the hold of the vessel.

Propelling Machinery

The main engines are cross compound DeLaval steam turbines with double reduction gearing, driving propeller shaft through Kingsbury thrust bearing. These turbines are designed to develop a maximum of 8800 shaft horsepower at 110 revolutions per minute. The propelling units are built with liberal factors of safety throughout. A reversing turbine is incorporated in the low pressure casing with a total astern power of approximately 3000 shaft horsepower. Steam will be provided by three Babcock and Wilcox water-tube ma-

rine boilers of the latest and most improved design with convection type superheaters. These boilers will be oil burning and each will have 5564 square feet of heating surface and 1044 square feet of superheating surface. The working pressure is 400 pounds per square inch and approximately 700 degrees total temperature. Fuel oil will be carried in tanks which are fitted in double bottom compartment under boilers and fuel tanks abreast of the machinery and in the after part of the side tanks heretofore mentioned. The power plant is built along the lines of the most modern American steam plant practice. The other main and auxiliary machinery is as follows:

- 1—Foster Wheeler main condenser and twin air ejectors.
- 1—Foster Wheeler auxiliary condenser.
- 2—Worthington vertical centrifugal lubricating oil pumps.
- 2—Davis lubricating oil coolers.
- 1—Sharples lubricating oil purifier.
- 1—McNab salinity indicator.
- 2—Worthington vertical centrifugal main condensate pumps.
- 2—Worthington centrifugal main circulating pumps.
- 1—Worthington centrifugal main feed pump driven by Sturtevant turbine.
- Worthington vertical simplex auxiliary feed pump.
- 1—Worthington vertical simplex port feed pump.
- 1—Feed injector.
- 1—Worthington deaerating type first stage feed water heater.
- 1—Davis second stage feed water heater.
- King-Seely Telegage system for settling and Bunker tanks.
- 2—Electric generators — General-Electric Turbine-driven 250 K.V.A., A.C., 3-phase, 60-cycle, 220 volts.
- 1—Worthington vertical simplex general service and fire pump.
- 1—Goulds hand deck pump.
- 1—Nash centrifugal self-priming ballast and bilge pump.
- 1—Nash centrifugal self-priming forward ballast pump.
- 1—Worthington centrifugal emergency bilge pump.
- 2—Waterous rotary cargo oil pumps.
- 1—Worthington centrifugal sanitary pump.
- 1—Worthington centrifugal auxiliary condensate pump.
- 1—Worthington centrifugal auxiliary circulating and oil cooler pump.
- 1—Ingersoll-Rand evaporator feed motor pump.

- 1—Ingersoll-Rand fresh water motor pump.
- 1—Ingersoll-Rand drinking water motor pump.
- 1—Elliott "Typhon" type whistle.
- 2—Quimby screw type fuel oil service pumps.
- 1—Worthington horizontal duplex emergency fuel oil service pump.
- 1—Waterous rotary fuel oil transfer pump.

Deck Machinery

- 1—American Engineering Co. hydro-electric steering gear.
- 1—American Engineering Co. spur geared windlass.
- 1—American Engineering Co. mooring winch—aft.
- 1—American Engineering Co. dock type gypsy—Forward.
- 2—American Engineering Co. vertical car hauling engines.
- 2—American Engineering Co. vertical electric hoists for stores.
- 1—Worthington single-stage air compressor for Pneumatic tools.

Electric power for the ship is furnished by two turbo driven generator units each of 250 K.V.A. capacity. The lighting for the vessel is furnished by three 10-K.V.A. 220 to 110-volt single-phase transformers.

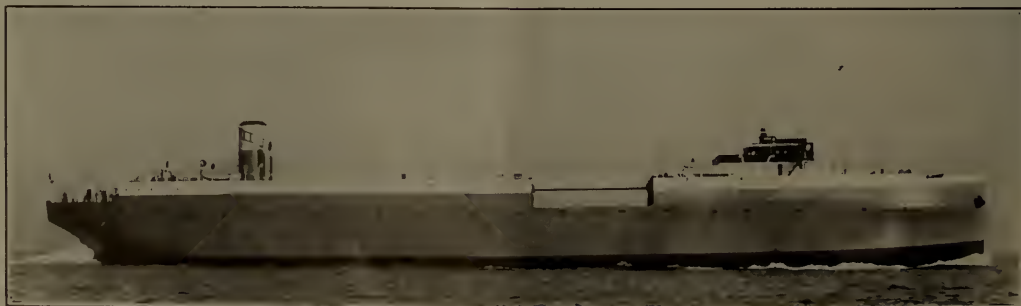
Provision for Perishable Cargo

One of the decks is equipped with complete refrigerating system with piping for connection to each car which is loaded with perishable cargo. The refrigerating machinery consists of: one Brunswick-Kroeschell 1¹/₂-ton motor-driven refrigerator unit for ship's stores; two Brunswick-Kroeschell 20-ton refrigerator units for car refrigeration.

Each ship is to have an R.C.A. radiotelegraph transmitter capable of operation on both the intermediate and shortwave length bands, as well as an R.C.A. radio direction finder, to permit bearings to be taken at any time and in any weather.

These vessels will be manned by a crew approximately as follows: Captain, chief officer, second officer, third officer, radio operator, boatswain, four quartermasters, ten seamen, steward, four mess boys, cook, assistant cook, chief engineer, second, third, and fourth engineers, deck engineer, three oilers, three water tenders, and three firemen.

This type of vessel was developed by Graham M. Brush, president of the Seatrain Lines, and the first vessel conforming to these ideas, built in England, has been in constant service between New Orleans and Havana since December, 1929. The two ships now being built by the Sun Shipbuilding & Dry Dock Company embody Mr. Brush's original ideas with modern improvements for faster and larger ships.



A broadside view of the Seatrain New Orleans under way.

Combination Carriers Delmundo and Delvalle

A RECONDITIONING program involving four Hog Island type cargo vessels has just been completed by the Mississippi Shipping Company of New Orleans. The original plan called for stepping up the speed of these steamers from 10 to 13 knots and installing accommodations for 25 first class passengers in each ship. The first two, Delnorte and Delsud, were fitted for 28 passengers and placed in service in 1931, as described in *Pacific Marine Review* for June of that year. The passenger quarters proved so popular that the second pair of conversions, Delmundo and Delvalle, were arranged for 38 passenger berths.

Delmundo and Delvalle were reconditioned by the Newport News Shipbuilding & Drydock Company in accordance with plans and specifications prepared by V. M. Friede, naval architect of New Orleans, and under his supervision, C. M. McKenzie, port engineer of the Mississippi Shipping Company, assisted in the machinery specifications and served as supervising engineer and resident inspector at the shipyard. Final judgment on these plans as meeting the requirements of the trade was made by N. C. Pedrick, general manager of the shipping company. All rules and recommendations of the American Bureau of Shipping, United States Steamboat Inspection Service, United States Public Health Service, and the United States Navy Department were closely followed. Although the United States had not yet formally ratified the International Convention for Safety of Life at Sea, these vessels were altered to comply with the rules of that convention. The chief change in this connection was the installation of a new watertight bulkhead subdividing Hold No. 1 and thus affording a very high safety factor.

Machinery Changes

In order to attain the desired speed of 13 knots, the turbine rotor and reduction gears were completely rebuilt by the manufacturers, the General Electric Company and fitted with their latest type of reduction gearing; a new Ingersoll-Rand condenser of patented design and of considerably larger capacity was installed; and air ejectors, a new circulating pump, a new condensate pump, new injection and discharge valves, and various other condenser auxiliaries of the latest design were provided in order to insure maximum efficiency



The steamship Delmundo on her trial trip.

of the propulsion equipment. A new four-bladed bronze propeller absorbs the power of this rebuilt turbine and drives the vessel easily at 13½ knots.

The three Babcock & Wilcox boilers were thoroughly overhauled and the boiler pressure was increased to 207 pounds per square inch. To further increase the efficiency of the boilers there were installed Diamond soot blowers, Babcock & Wilcox feed water regulators, Rowe and Davis feed water heaters, and Warren feed pumps of larger capacity.

Fifteen staterooms are provided, all outside rooms. Six of these rooms have private bath with hot and cold fresh water showers. Hot and cold fresh water is piped to all staterooms. There are four public baths.

The furniture, lamps, draperies, and curtains were selected by Elizabeth Capers, a New Orleans interior decorator. The staterooms are furnished with beds manufactured especially for the vessels by the Crescent Bed Company of New Orleans and fitted with the well known Simmons Beautyrest mattresses. For comfort in the staterooms exceptionally large air ports are provided and those rooms having openings to the side of the ship are fitted with large sliding windows manufactured by the American Locomotive Company.

A complete fire detecting system covers all space; cargo holds being fitted with the Rich smoke detecting system and the quarters and staterooms with the Zonit automatic electric fire alarm system. In addition to other extinguishing facilities, a complete Foamite fire extinguishing system has been installed in the engine and boiler rooms.

The addition of these four vessels to the fleet of the Mississippi Shipping Company marks a noteworthy achievement in rebuilding machinery and hulls, and will enable this firm to handle a steadily increasing volume of passenger and cargo business between the United States Gulf ports and the East Coast of South America.



Three interiors on the Delmundo. At left, the spacious lounge; center, a stateroom; and, at right, the dining saloon.



The new Westfal-Larsen motorship Berganger operated by the Interocean Line.

Fast New Norwegian Motorship

*Interocean Line Introduces 17-knot Combination Motorship Berganger,
Reducing Pacific Coast-Europe Time to 20 Days*

THE new Norwegian motorship Berganger, now visiting ports of the Pacific Coast on her maiden voyage, is the first of three sister ships built for Westfal, Larsen & Co. of Bergen, Norway, by the Netherlands Shipbuilding Company at Amsterdam. These three vessels will be operated in the Interocean Line and are of particular interest as being the fastest vessels in the Pacific Coast—European service. The Berganger made 17.25 knots on her official trial and will operate at a 16-knot sea speed, reducing the time between the last Pacific Coast port and the first

port in Europe to 20 days.

Principal characteristics of the vessel are:

Length over-all	486' 0"
Length between perpendiculars	456' 0"
Molded beam	61' 0"
Molded depth to shelter deck	39' 6"
Mean loaded draft	27' 2"
Deadweight carrying capacity at this draft, tons	9825
Shaft horsepower	6700

Berganger and her sister ships have a raised fore-



The passenger accommodation on the motorship Berganger, although limited to six cabins, is first class in every respect and luxuriously comfortable in all of its appointments.

Here is shown the dining room, which has seating capacity for thirty persons and is served by a completely equipped modern electric galley.

castle and poop with bridge and deck house over the machinery spaces amidship. They have two masts and four sets of posts to take care of the cargo handling booms. At the base of the forward pair of posts and of the mast there are turret erections to lift the winch gears clear of the deck. They have well raked bows, merchant cruiser stern, which, in combination with the other features already mentioned, give these vessels a very shipshape and pleasing profile.

Large refrigerated cargo capacity is provided, the total being 106,000 cubic feet. In the bulk of this space the cooling is effected by air circulation, one small hold being fitted for the carriage of frozen fish, meat, or poultry. The cooled air storage has a capacity for 55,000 boxes of apples.

The entire double bottom is fitted to be used as tanks for fuel oil, ballast water, lubricating oil, or cooling water. The guaranteed fuel consumption at full power is 0.35 pound per brake horsepower hour, which would be approximately 27 tons daily. The fuel capacity is ample for the round trip from San Francisco to Europe.

Propulsion Machinery

The vessels are single-screw and are equipped with A.E.G.-Hesselman diesels built by Stork & Company of Hengelo, Holland. They are of the double-acting two-stroke type with seven cylinders, 700 millimeter bore, and 1200 millimeters stroke, developing 6700 brake horsepower at 115 revolutions per minute. The average mean effective pressure, top and bottom, is 63 pounds per square inch.

These engines have a scavenge pump incorporated, driven off an extension of the main shaft. Even with this handicap they show a mechanical efficiency of 86 per cent. The length of the engine room is 50 feet.

A special type of Hesselman fuel valve is used, which, together with the shape of the combustion chamber, the special fuel filter, and the carefully designed fuel pump, enables this engine to make good on the remarkably low consumption guarantee. De Laval oil purifiers are provided and a Turbulo filter plant.

Outside of the main unit, all machinery on the ship



The double-acting 2-cycle 7-cylinder diesel engine is built on the A.E.G.-Hesselman system. Our view shows the middle platform featuring cylinder lubricators; at lower right center may be seen the operating controls.

is electrically operated. Electric power is supplied from three Stork-A.E.G.-Hesselman 4-stroke cycle, single-acting diesel engines, each driving a 180-kilowatt dynamo-generator at 400 revolutions per minute. For taking care of the cargo there are ten 3-ton, four 5-ton, and four 1½-ton electric winches. The steering gear is of the A.E.G. all-electric type operating a Simplex balanced rudder, both built by Deutsche Werft.

A corner in the smoking lounge on the motorship *Berganger* featuring electric heating, lighting, and ventilation, rubber tile floors, hardwood wainscoting, luxurious leather upholstery, and an effective design of beam ceiling.





Look at the deck promenade space and at right a stateroom.

At left may be seen one side of the deck promenade space and at right a stateroom.



The dining room lobby features this very effective stairway design. Note the neat blending of well fitted cabinet work into the structural steel of the hull.

and the refrigerating machinery is contained in a special compartment in the main engine room.

These vessels are fitted with a limited first class passenger accommodation, arranged in six cabins on the boat deck amidships. Each cabin has an adjoining toilet room with shower bath and is equipped with running hot and cold water and a continuous supply of ice water. At the forward end of the boat deck a lounge is furnished as a smoking room; and on the shelter deck amidships is a nicely equipped dining room for seating thirty at small tables.

Westfal, Larsen & Co. are to be commended for their enterprise and vision in assuming responsibility for the large investment involved in these speedy combination cargo and passenger liners, which take their place in the Intercean Line service, together with five other modern motor liners, all designed especially for Pacific Coast—European trade and all built since 1928.

Ports of call in Europe are Havre, Antwerp, Rotterdam; and the fact that these ports are now brought so much closer to the Pacific will be appreciated by all Pacific Coast exporters and especially by those interested in the quickest possible delivery of their fresh fruits.

Stern Frame Design for Welded Steel

PAUL V. Jankov, a naval architect and surveyor for Det Norske Veritas at Oslo, Norway, submitted a paper on the subject "Some Points Regarding the Elimination of Steel Castings in Shipbuilding" for the Second Lincoln Arc Welding Prize Competition sponsored by the Lincoln Electric Company of Cleveland, Ohio. The substance of this paper is here abstracted for the convenience of our readers.

Stern frames are the largest and most complicated steel castings used in a vessel's hull. Their weight frequently reaches 12 tons in large vessels and sometimes reaches 20 tons. Much trouble is experienced with these castings and they are quite expensive in production costs. Rules for strength of sections are based on empirical formulae crystalized through long experience by the various classification societies.

The requirements of these rules can easily be met in welded steel construction with great savings in weight and in costs, and with greater strength and dependableness. Illustrations of the original paper show proposed detail designs for a welded stern frame for twin screw vessels and one for single screw vessels. The twin screw welded design gives a saving in weight of 43 per cent. as compared with a cast steel stern frame, both being designed to the rules of the Norse Veritas.

In the design for the single screw ship, the saving in weight is even more striking. Here the welded stern frame is 56.8 per cent. lighter than a cast steel frame of the same strength. In this particular design this saving amounts to 5 tons deadweight carrying capacity saved for the ship. The estimated costs show an advantage of approximately 14 per cent. for the welded designs.

An Arc Welded Naval Auxiliary Vessel*

By Lieut.-Comdr. Homer N. Wallin,
and Lieut. Henry A. Schade

U.S. Navy Yard, Mare Island

ARC welding has been in general use by the Navy, principally on repair work, since the epoch making war days when the sabotaged engines of seized German liners were salvaged by this comparatively new art. It is only since the displacements of naval vessels have been limited by international treaties, however, that the Navy has begun to look upon arc welding as a standard method of construction. Displacement limitations, being equivalent to weight limitations, naturally place a premium on methods of construction by which weight may be reduced without loss of desirable characteristics. With this impetus, arc welding is supplanting riveting over a wide range of

*Abstract of a paper which was awarded First Prize in the Second Lincoln Arc Welding Prize Competition. The complete paper will be published in book form by the sponsors.



The arc welded self-propelled U. S. Navy barge going overboard at Mare Island.

applications in increasing amounts on each new ship designed by the Navy.

A movement toward the construction of ships of large dimensions entirely by welding is developing along two lines; viz., the increasing partial use of the process on large ships, and the complete substitution of welding for riveting on small ships. The Navy Department has extensively participated in both phases, first entering the latter in 1930 when it authorized the construction of two motor tugs, two self-propelled garbage vessels, two sea-plane wrecking derricks, and several smaller vessels by the all welded method.

The construction of one of these craft, a garbage vessel, was undertaken at the Navy Yard, Mare Island, California, and was completed on September 15, 1931. The hull of this vessel, as shown in the illustration, has a conventional ship-shape form with straight vertical stem and transom stern, a length of 118 feet, beam of 25 feet, and full load draft of 5 feet 3 inches. The carrying capacity is 125 tons, which gives a full load displacement of approximately 300 tons.

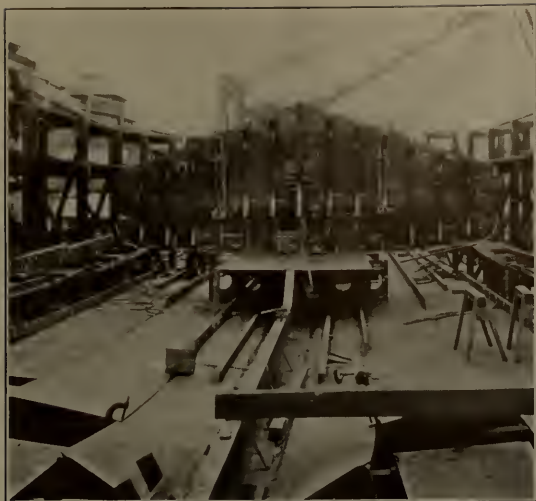
As the Navy is interested only technically and not competitively, it is believed that a great deal of good can be done in the field of electric welding by making available complete information on the design and construction of this vessel. Lap joints were adopted for all shell seams and as a general rule for all other plate seams throughout the ship. The joggled lap was used, which allows all bulkheads and internal framing to be worked to the molded line.

Tensile Tests

A number of tensile tests were made for the purpose of determining the best design for the plate seam lap joints. Specimens were made from 3/8 inch medium steel plating which on test showed an average tensile strength of 59,630 pounds per square inch. All specimens failed under tension in the plate rather than by failure of the weld and all but one fractured adjacent to a line of welding.

SAMPLE	SIZE OF WELD	TYPE OF JOGGLE	BREAKING LOAD LBS.	BREAKING STRESS LBS./SQ. IN.	LOCATION OF BREAK.
1	1/4	SHORT	64 120	42 735	
2	3/8	"	84 160	56 100	
3	"	"	80 000	53 330	
4	"	"	79 000	52 660	
5	"	"	78 180	52 120	
6	"	"	75 760	50 500	
7	"	"	58 000	44 660	
8	1/4	"	66 200	44 180	
9	"	"	60 100	40 000	
10	3/8	LONG	91 280	60 850	
11	"	"	86 640	57 760	
12	"	"	83 230	59 480	
13	1/4	"	71 000	47 330	
14	"	"	78 000	52 000	

Table of results of tensile strength tests on arc welded lap joints.



A construction view of the arc welded garbage barge at Mare Island showing bottom plating, keel, and a bulkhead in place.

While the tests actually made were not sufficiently comprehensive to establish definitely the relative values of the features under consideration, they provided fair indications of what might be expected and consequently furnished a basis for the design of lap joints to be used. It was decided to use a 1½-inch lap with a full fillet weld on each side of the lap and to use the long joggle.

Framing

The longitudinal bar frames (or longitudinals) along the shell, deck, and hopper are 3x5x1-5 8x6-inch angle bars, with the edge of the wide flange against the plating. They are spaced about 2 feet apart and fall on each plate lap and along the middle of each plate. The transverse web frames (or transverses) are spaced from 5 to 7 feet apart. Each transverse is built up of a web about 18 inches deep with a symmetrical face plate double fillet-welded normal to it. The connections between the longitudinals and the transverses or bulkheads are locked together at points of intersection. The transverses and bulkheads are slotted to take the standing flanges of the longitudinals, and the face flanges of the longitudinals are slotted to take the transverses and bulkheads. This results in intercostal face flanges and continuous standing flanges, and the meshing of the slots forms a "lock-joint." Bulkhead stiffeners are spaced to connect by means of brackets to the longitudinals on the bottom plating and under the deck or hopper plating. They consist of 3x4-inch angle bars with the standing flange forming a T-joint against the bulkhead plating.

The longitudinals, transverses, and bulkheads form T-joints with the shell. The first two were intermittent welded, using the chain arrangement, and the boundaries of the water-tight bulkheads were continuous fillet welded on both sides. The T-joints between the standing flanges of the bulkhead stiffeners and the bulkhead plating were also intermittent chain welded. The "lock joints" between the longitudinals and the transverses were welded on the outside of the bar only, water-tightness not being required.

Assembling Methods

The usual method of holding the parts together be-

fore welding is to use bolts. It is necessary to lay out and punch the holes in the shop, bolt up on the ways, remove the bolts after welding, and usually to weld up the bolt holes after they have served their purpose. Although this method has apparently been generally used, the decision was made to assemble and erect this vessel without the use of assembly holes for bolts.

Originally it was intended to use the system of tack-welding employed by some of the German shipyards, consisting of very small tack-welds about the size of a pea, called "pea" welds, spaced about a meter apart. Tack-welds of this size provide a bond which is purposely so weak that the tack-welds break in case appreciable stresses develop in the joints during the finish welding. It was very soon discovered that such "pea" welds are not strong enough to resist even very small shrinkage stresses. The system was modified, and "string" welds were used for tacking, having a length of about 1 inch and a nominal size of 1/8 inch, spaced about 12 inches apart. These tacks are strong enough to hold the parts but weak enough to break when shrinkage stresses become excessive.

It was the practice to assemble and weld up in the shop as many units as considered practicable and advantageous, especially flat assemblies such as bulkheads, transverses, and hopper plating.

After experimentally assembling and welding two bulkheads on an I-beam platform, all remaining bulkheads and flat assemblies were assembled and welded on the bending slab. By using this method, warping of the edges of the plates is easily restrained by dogging them down. Furthermore, the plates being supported at practically every point, there is no tendency to distort resulting from sagging of plates between supports, as there is on the I-beam platform. The intimate contact between the plates and the slab, which is an excellent heat conductor, appears to assist in reducing the heated areas by conducting the heat rapidly away, and this also reduces the tendency to distort. The units are easier to assemble on a flat surface than on the I-beam platform, and the use of a heavy roller for forcing the laps together is made possible.

Erection on the Ways

The vessel was constructed on keel blocks adjacent to one of the dry-docks in suitable position for side launching after being skidded to the edge of the dock. After the three keel sections had been laid on the keel blocks the bottom plating was laid out in a cradle which was built an inch or two lower than the final location of the plating, after which the seams and butts were tack welded. The bottom longitudinals were next set in position and tack welded. Each completed transverse bulkhead and transverse was erected in its proper location, plumbed, and the bottom plating shored or pulled to it. Since the bulkheads and transverses were slotted to take the longitudinals, and the latter were slotted to take the former, it was not difficult to set these transverse parts in their proper locations. When most of the bulkheads and transverses had been erected the side longitudinals were placed in position in the proper slots. The hopper plating was placed in position as soon as all the bulkheads and transverses supporting it had been erected. After the bulkheads and transverses extending above the hopper deck had been erected, the side plating was carried up to the sheer strake. Finally, the deck longitudinals and deck plating were placed in position.

This was accomplished by a variety of methods de-

pending on the conditions. Shores, clamps, wooden wedges, levers, weights, chain falls were all effectively used. Where the plates had considerable shape it was sometimes necessary to tack-weld a bolt to one part and a clip, through which the bolt could pass, to the other. The use of an air jam backed up by staging proved very successful in forcing plates against framing. On the whole there was very little difficulty in bringing the parts into satisfactory contact for tack welding, and the methods employed were considerably cheaper than the general use of bolts and bolt holes would have been.

The men used are welders capable of both arc welding and gas cutting. One was assigned with each shipfitter, and when thus assigned did no finish-welding whatever. His duties were to do gas-cutting, tack-welding, and temporary welding, such as clips, as required by the shipfitter, and when not so employed to assist the shipfitter in a capacity similar to that of a helper. This system eliminated much lost time, since shipfitters were never waiting for a burner or a welder, and welders were not interrupted by calls from the shipfitters to do tacking or temporary welding. One gang composed of shipfitter, helper, and combination welder could do the entire job of preparing a part of the structure for the finish-welders after the riggers and shipwrights had done the necessary erecting and shoring.

Since the weather decks have both camber and sheer, fabrication and welding in the shop would have involved mocking up to shape during welding, and this would lose much of the advantage obtainable by dogging down plating to the slab as was done with the bulkheads. Consequently, this work was done on the ways and although it involved a large amount of overhead welding where the longitudinal deck beams weld to the decks, this was not considered a serious problem; the welders apparently are able to produce overhead work very nearly, if not entirely, equal in quality and quantity to work done in the flat position. When decks are welded up on the ways it is best to leave the margin oversize for trimming after welding.

Launching

The launching constituted a very severe test of the vessel's ability to stand shock and sudden pressure, as in the side launch there was a vertical drop of about 3 feet 3 inches between the end of the ways and the surface of the water. Since the draft of the vessel at launching was 2 feet 9 inches this means that there was a total vertical drop of about 6 feet between the position of the vessel at the ends of the ways and the position at rest in the water. A very careful examination immediately after launching disclosed no leaks and no evidence whatever of any structural weakness.

Saving over Riveted Job.

The obvious and outstanding advantage of welding over riveting in shipbuilding consists in the saving in weight of structural hull material.

The increased weights of the elements of the riveted hull, expressed as percentages of the weights of the corresponding elements of the welded hull, are itemized below:

	Per Cent.
Longitudinal frames and beams	43
Bulkheads	22
Decks	11
Shell Plating	3
Transverses	0

When each of these percentages is multiplied by the fraction which the welded element is of the total weight of the welded hull, and the results are added, the riveted hull is found to be 17 per cent. heavier than the welded hull.

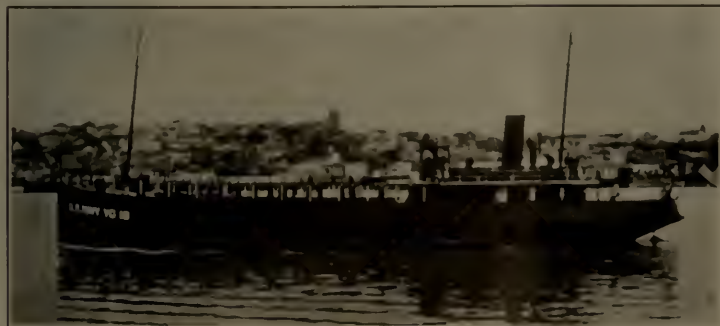
In the cost comparison which follows, the cost figures for the welded vessel are the actual costs to the government exclusive of the machinery units. These costs are divided into their elements, labor, overhead and material.

COST OF WELDED AND RIVETED SHIPS

Item	Welded Ship	Riveted Ship
1. Mold loft work	\$ 5 178 00	\$ 6 370 00
2. Pickling and painting of structural steel	1 227 87	1 436 00
3. Fabrication and erection of steel hull	28 474 15	42,890 00
4. Welding (or riveting) of steel hull	11,884 75	11,425 00
5. Cleaning steel in way of welding	509 73	
6. All other items except machinery	61,606 29	61,606 29
7. Subtotal (hull and fittings complete without machinery)	\$108 880 89	\$123,637 29
8. Machinery items (except cost of units)	\$ 18 860 51	\$ 18 860 51
9. Grand total (except cost of machinery units)	127 741 40	142,497 80

The difference between the two totals is \$14,756.40 which is the minimum saving in first cost obtained by using welding instead of riveting on this vessel. Comparing this with the total cost of the riveted vessel (exclusive of machinery units) the saving is slightly over 10 per cent.

In addition to this first saving in cost there are other savings which cannot be so explicitly stated in terms of dollars. The riveted ship, being 17 per cent. heavier, has a correspondingly reduced carrying capacity.



Broadside view of the completed arc welded steel barge on her trials in the estuary of the Napa River, off Vallejo, California.

Pumps for Marine Service

By W. Jackman*, O. H. Dorer, and H. M. Chase**

Part VI. Lubricating Oil and Fuel Oil Pumps

THE features worthy of note in the use of centrifugal lubricating oil pumps that are different from the usual water pump lie in the viscosity of the fluid. The internal friction and the disc friction of impeller walls tends to increase rapidly and increase the driving horsepower as the viscosity increases. In addition, some head is lost. A 400-gallons per minute pump working with 200 degrees Saybolt oil at 50 pounds pressure, a specific gravity of 0.83 and 1700 revolutions per minute, will not have more than 58 per cent. efficiency. Fig. 2 shows 74 per cent. water efficiency. At 600 degrees Saybolt the efficiency is not over 47 per cent. Consequently these pumps are not economical except in the field of the lighter, less viscous oils. As the size of the pump increases, the comparison is not as unfavorable. The calculation of oil efficiencies is a complicated procedure, but some manufacturers have this data worked out in the form of factors to employ on water efficiencies that render the selection quite easy. The rotary pump is advisable for many applications as noted below. It is a self-priming pump, whereas the centrifugal is not, except as special provisions are made for this feature. The centrifugal pump may be submerged within the lubricating oil tank and arranged vertically. It is preferable to locate the pump outside the tank and sufficiently low so the oil will flow to it under a head. In this type of installation the pump is out where it is accessible and can be taken care of.

When a centrifugal pump is contemplated it is always

necessary to consider both the specific gravity and the viscosity to properly convert the requirements into a feet head basis—the fundamental basis of the centrifugal type.

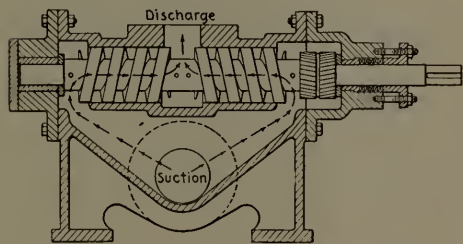
Rotary.—The supply of lubricating oil to the main propulsion units must be constant and the flow should be free from pulsations.

The requirements of this service are most satisfactorily met by the rotary pump. This is a positive displacement pump and, at a constant speed, will deliver constant capacity. A considerable variation in pressure will have but little effect on the volume pumped. Inasmuch as a rotary pump has internal wearing surfaces which can only be lubricated by the liquid passing through the pump, this type is particularly adaptable to this service.

At a speed below 500 revolutions per minute, the efficiency at the usual pressure of approximately 50 to 75 pounds per square inch is high, and under favorable conditions may be 80 per cent. The pump is generally connected to the motor through a single gear reduction permitting the use of a high-speed motor with a moderate-speed pump.

There are many varieties of rotary pumps offered, but for this service the following types have been found to be most satisfactory:

1. The double rotor of four lobes with specially formed teeth to insure constant contact, and with intake and outlet arranged to prevent trapping of oil by the meshing of the rotor teeth. As the rotors are not capable of being driven one from the other, a set of pilot gears is required.

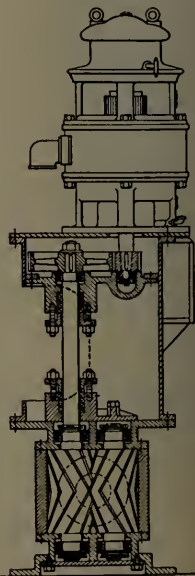
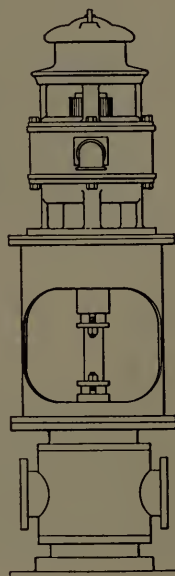
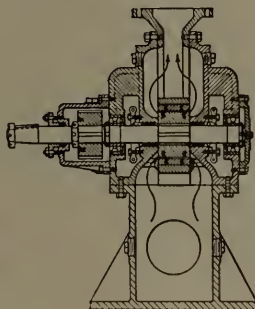
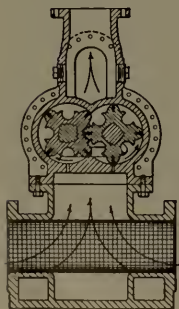


Typical rotary pumps for oil service.

Upper left, the double screw type.

Lower left, the double 4-lobed rotor type.

At right, the vertical herringbone gear type.



*Manager, Marine Sales, Worthington Pump and Machinery Corp.
**Paper read at Annual Meeting of the Society of Naval Architects and Marine Engineers, November 19 and 20, 1931.

2. The double-screw type, which consists essentially of two shafts maintained in equal rotation by pilot gears and carrying special shaped intermeshing screw threads which force the liquid from the intake at one end to the discharge at the other.

3. The herringbone gear type in which pilot gears are not required since the gear mounted on the power shaft is capable of driving its mating gear.

The usual range of capacities from 100 to 700 gallons per minute can be obtained in any of the above types with a pump of light weight, requiring small floor space.

Fuel Oil Pumps

Centrifugal.—The centrifugal pump is not suitable for this service, due to the small capacity, high pressure and high viscosity.

Reciprocating and Rotary.—For this service, 5 to 50 gallons per minute and 150 to 350 pounds pressure, the power consumption is small and the efficiency a relatively unimportant factor. Dependability, even dis-

charge flow and regulation of capacity to maintain constant pressure are essential.

The duplex direct-acting steam pump and the motor or turbine operated rotary pump are the preferred types.

The vertical duplex steam pump is a particularly reliable machine. It occupies but little floor space and can be mounted so as to be readily accessible. A pressure governor, connected to the discharge and operating a valve in the steam line which controls the pump speed, maintains a constant pressure on whatever number of burners may be in service.

For motor or turbine operation, the rotary pump offers the simplest, most reliable unit and gives a steady, non-pulsating flow. It may be of any of the types similar to those used for lubricating oil. The pressure may be automatically maintained by a constant pressure hydraulic type regulator which operates the throttle of the turbine, or a rheostat controlling the speed of the motor.



Motor Tanker R. L. Hague

MONFALCONE Shipyard of Trieste, Italy, delivered the first of the group of nine motor tankers ordered in July, 1931, from European builders by the Standard Shipping Co. of New York.

The first of the Italian-built tankers was named R. L. Hague, after the well known vice-president of the Standard Shipping Company. The vessel's principal dimensions are as follows:

Length on designed waterline	535 ft. 0 in.
Length between perpendiculars	520 ft. 0 in.
Maximum breadth	70 ft. 0 in.
Depth at upper deck	38 ft. 0 in.
Design draft, molded	28 ft. 8 $\frac{3}{4}$ in.
Displacement, tons	23,415
Deadweight carrying capacity, tons	17,800

These vessels were built to the highest classification requirements of the German Lloyd and Lloyd's Register of Shipping. The hull is constructed on the Isherwood system with two longitudinal bulkheads, which, together with a number of transverse bulkheads, divide the cargo space into nine groups of center and wing tanks. Five of such groups are located forward of the pump room and four between the pump room and the machinery spaces. The ship's cross bunkers are located immediately abaft of the last cargo tank and separated therefrom by a cofferdam. The space between the collision bulkhead and the forward tanks has been fitted for general cargo. The lower part of this space con-

tains an auxiliary pump room.

The propelling machinery consists of two 6-cylinder 2-cycle single-acting solid-injection Fiat diesel engines of 600 millimeter bore and 1100 millimeter stroke, each rated 2250 shaft horsepower at 120 revolutions per minute and guaranteed for an overload capacity of 2500 shaft horsepower at 125 revolutions per minute. While the Fiat Company has been building small solid-injection engines for several years, the main propelling units of the tanker R. L. Hague are the first large powered airless injection engines built by this company. During extensive shop tests they operated smokeless from fractional loads up to 40 per cent. overload.

Each main engine exhausts directly into a Clarkson thimble-type boiler, which also acts as a silencer. These two exhaust boilers supply sufficient steam to operate all the auxiliaries required at sea. The steam needed for port use is supplied by two Scotch boilers of 2500 square feet heating surface.

Air for starting and maneuvering is furnished by a compressor with capacity of 300 cubic feet of free air per minute, driven by a 140-horsepower Fiat engine running at 275 revolutions per minute. There is also a steam-driven stand-by compressor of 25 cubic feet per minute capacity.

On trials held June 27 the vessel, fully loaded, developed a speed of nearly 13 knots over the measured mile, thereby materially exceeding the contract requirements.

A Big-Little Motorship

*Interesting Oceanographic Craft Built for the University
of Washington with Rockefeller Foundation Funds*

At the dedication exercises recently held for the new Oceanographic Building of the University of Washington, the new Oceanographic vessel Catalyst, built by the Lake Washington Shipyards, was moored to its new dock.

This sturdy vessel had undergone sea trial of the main and auxiliary machinery and of the operation of its laboratory. In Haro Strait, the Catalyst successfully brought up from the bottom net loads of marine life and also obtained samples of sea water at different depths. The operations met with the full satisfaction of the oceanography professors who viewed the trials.

Her principal dimensions are:

Length over all	74 feet 7 inches
Length on waterline	72 feet 0 inches
Beam molded	18 feet 0 inches
Draft maximum	9 feet 0 inches

Construction funds were provided by the Rockefeller Foundation which is also providing for a five year period of operation. Rowlands and Strickland, naval architects and marine engineers of Seattle, designed the vessel and supervised her construction.

Powered by a Washington diesel engine generating 120 shaft horsepower at 450 revolutions per minute and clutch-connected to a 42-inch diameter Coolidge propeller, the Catalyst has a speed of 9 knots. The profile shows considerable sheer, with the least freeboard just aft the center of the ship. The bow has a pronounced flare, similar to the modern yacht, while the forefoot is sharp and deep, resulting in a small amount of drag to the keel. The shape of the water-line is slightly hollow forward, giving a fine entrance. The stern is the full cruiser type. Amidships and below the water-line there is considerable dead-rise. Antirolling keels are fitted just below the turn of the bilge and run about 30 feet of the length. The design of hull is such as to give a slow and comfortable roll with a positive righting moment up to more than 90 degrees of inclination, making the vessel an excellent sea boat. All outside doors, window frames and built-in furniture are of teak.

An Allan Cunningham 5-horsepower special electrical winch located in the forward end of the engine room has three drums to handle the cables used by the scientists to obtain samples and specimens. One drum holds 15,000 feet of $\frac{1}{4}$ -inch diameter Roebling stainless steel wire cable, rust proof and nonlubricating in order



The new oceanographic motor ship Catalyst.

to prevent contamination of the sea water samples. The Catalyst is claimed to be a pioneer in the use of chrome nickel steel alloy wire for this work. A specially designed Allan Cunningham compensator at the end of the boom absorbs the inertia forces that are set up in the cable due to reversal or speed change. A second drum contains 2000 feet of $\frac{1}{2}$ -inch diameter Roebling plough steel galvanized wire cable used for dredging and net trolling. A third drum contains the topping life wire rope of the dredge boom.

The laboratory, located at the forward end of the main deckhouse, is 10 feet 6 inches wide and 18 feet 6 inches long. On each side is a laboratory table, under which are four sets of drawers so that four can work at each table. Each worker has the use of electrical outlets of 110 volts alternating current, and 110 volts direct current, and variable voltage direct current. There are two outlets of compressed air at a pressure of 8 pounds per square inch. Finally there are six outlets of Flamo gas for use with Bunsen burners and chemical hotplates. The Flamo is piped from four large cylinders on the stern deck. Shelves are spaced in two tiers above the tables and between the windows. Entirely enclosed is a Duriron pipe line at each table, with funnels to receive acid discharges during experiments. These drains lead into a lead lined sink and from there the acid is discharged overboard through acid-resisting piping. Above the sink is a chemical hood completely lined with Transite fire-proof material. Concentrated acids are placed in this compartment, for the door is of glass permitting observation of the chemical reactions. A Duriron blower is connected to the hood and removes the fumes from this space, discharging to the atmosphere. Fresh and salt water are available in the laboratory.

The laboratory is illuminated by the indirect method with nine 150-watt lamps hidden by deflectors located on shelves above the desks and reflecting on the white ceiling. Efficient laboratory ventilation is provided by an American Blower Company Aeropel reversible fan.

Outside the laboratory are ten specimen tubs used to transport sea life to the shore station. The specimens are kept alive by means of running salt water from ten outlets along the deckhouse, as well as ten air outlets. The latter are supplied by means of a reducing valve at the main engine starting air tanks.

The after end of the main deckhouse contains the galley and messroom occupying fourteen feet of its length. A Wedgewood restaurant size gas range with six burners and thermostatically controlled oven, a Ruud 20-gallon gas-operated hot water heater, with automatic control, a sink and drain board with lockers under, an Electrolux Model EA5 gas-operated refrigerator, a large buffet, and a built-in teak table large enough to seat ten persons comprise the equipment and furnishings of this space.

Under the raised deck forward and below the main deck aft comfortable quarters are arranged for a crew of 3 and for 14 oceanographers. The berths in these quarters are all equipped with Millionaire type spring mattresses built by the Washington Furniture Company. There is a 700-gallon fresh water tank under the forward quarters and a 500-gallon fresh water tank just aft of the after quarters.

The engine room occupies 19 feet 6 inches length in the center of the hull. In addition to the main engine, it houses two 1250-gallon fuel oil tanks, a 5-kilowatt General-Electric generator driven by a 9-horsepower Lister diesel engine; a 56-cell 287-ampere-hour Exide storage battery; a 3½-kilowatt Engberg generator belt-driven from the main engine; a switchboard with automatic charging and charge cut off equipment for the storage battery and complete controls for all lighting and power circuits on the vessel; an Arcola heater with Ray oil burner for the hot water system that heats all the living and working quarters; a Lux carbon dioxide fire extinguishing system; and pumps for the various circulating pressure and drainage systems.

Pilot house equipment includes a 7-inch reduced diameter Ritchie compass; an 8-inch Baker compass and binnacle; a Sperry 12-inch incandescent search light; a Fathometer supplied by the Submarine Signal Company; and apparatus for remote control of the main engine. Captain's sleeping quarters form the after part of the pilot house.

The electrical circuits and automatic switching devices installed on the Catalyst are very unusual on shipboard and deserve further notice. The 3½-kilowatt generator runs in parallel with the battery. Surplus power generated charges the battery which in turn takes up the burden when connected load exceeds capacity of generators. Electrical power supply is completely automatic and requires no attention from the engineer when the ship is under way or stopped for a short period of two or three days. No manual adjustments are possible under automatic control, and only casual periodic inspection is required.

Continued overcharges obtained on long cruises are prevented at the switchboard by automatically disconnecting the generator from the battery when it is fully recharged. Likewise after a 15 per cent. discharge of the battery, the automatic switching equipment reconnects the generator with the battery until the latter is



The interior of the engine room of the Catalyst featuring the 120-horsepower Washington diesel engine and the special three-drum Allan Cunningham winch.

fully recharged. Failure of any of the automatic devices will not shut down the main generator, as complete manual control of this machine can be obtained by a throw of the switch which cuts out all automatic devices. The anchor windlass and scientists winch are provided with relay-operated protective contactors mounted on the switchboard, and these eliminate all fuses from the circuits. In the event that an overload on the windlass or winch has tripped out the switchboard relay, the operator can reset the protective relay and contactor on the switchboard without leaving his station on deck. This is done by moving the motor controller handle to the off position and then notching out the controller, resuming work. Relay protection for the bottle winch motor is assured for the relay is accurately calibrated to trip at loads which are within the maximum allowable tension that may be applied to the deep sea sampling cable.

Another protective feature of the switchboard is a carbon pile regulator to control the main generator output current, so that, regardless of the speed of the main engine or state of charge of the batteries, the generator current is constant and the circuit needs no attention from the engineer. As the battery rises to 145 volts during a charge, a voltage control feature was obtained by the installation of a similar carbon pile voltage regulator. This limits the voltage supplied to the ship's lighting and small motors to 118 volts and operates by an auxiliary relay which picks up only when the battery is being charged.

The electrical installation was designed by Joseph Lamson, electrical engineering instructor on the faculty of the University of Washington.



Marine Equipment

AN UNUSUAL TUG ~ STANDARDIZED DIESELS
ELECTRIC TRUCK FEAT ~ NEW PROPELLER PUMP

An Unusual River Tug

AN interesting application of diesel economy is presented by the new split-stern-wheel type river towboat R. F. Winton, designed and built for service on the Ohio, Monongahela, and Allegheny Rivers at Pittsburgh by her owner Captain Walter Halfhill of the Halfhill Towing Company.

R. F. Winton has an over-all length of 110 feet, a beam of 26 feet, a depth of 3 feet 8 inches, and a draft of 2 feet. In this shallow tray of a hull she carries 470 shaft horsepower developed by two 6-cylinder, 10-inch bore, 14-inch stroke, airless injection, Winton diesel engines of the type developed especially for heavy duty service in modern towboats. These engines develop their rated capacity of 235 shaft horsepower at 350 revolutions a minute.

Each of the main propulsion units drives independently one half of the split stern wheel. Power is transmitted through belts to clutch pulleys mounted on the counter



Interior of the engine room on towboat R. F. Winton looking thwartship between the two 235-horsepower Winton diesel engines.

shafts, and from these counter-shafts by chain to the stern wheel. The clutches are controlled from the operating stand in the engine room. This makes a very flexible arrangement and allows considerable vertical weaving of the hull without disturbance to the power transmission. The main engines are set athwartship.

Towboat R. F. Winton is very easy to operate and to handle. With

two large rudders and with the stern wheels operating independently, she can, if desired, almost spin in a circle whose diameter need be a little more than her own length. The wheels are 14 feet in diameter and 9 feet long, with 12 arms. The buckets are 26 inches deep.

Auxiliary equipment includes a Winton combination generator and air compressor set driven by a 1-cylinder Winton high speed diesel engine. Driven by this flexible power plant, the towboat easily makes ten miles an hour running light and has demonstrated a towing capacity for 3600 tons upstream in the open river at 6 miles an hour.

New Heater for Oil Storage Tank

A STORAGE tank oil heater that has recently been placed on the market by The Griscom-Russell Company is distinguished by a unique type of heating element which makes the unit particularly compact, effective, and economical.

The patented G-Fin heating elements in this apparatus consist of a number of U-shaped steel pipes having longitudinal fins along the exterior surface of the straight portions of each pipe. These fins are equally spaced about the circumference of the pipe and are securely fastened by a mechanical process without tinning or similar bond which would limit the operating temperature.

The purpose of the longitudinal fins is to increase the heat-transmitting surface on the outside of the pipes in contact with the oil to be heated for withdrawal from the tank. The total surface of the fins on each pipe is from 4 to 6½ times greater than that of a bare pipe of



Broadside of the towboat R. F. Winton against the Pittsburgh waterfront.

the same length and diameter, so that the cold viscous oil is heated sufficiently to flow readily in a small fraction of the time required by a bare tube heater of the same dimensions. Therefore, this design permits a far more compact and economical unit for a given heating duty.

This unit is said to be also far more economical in steam consumption than pipe coils located in the bottom of the tank because it heats the oil locally at the point of withdrawal from the tank.

The heater is installed with the shell and heating elements extending into the tank and the steam, drain, and oil connections outside the tank. Special provisions in the design of the unit facilitates flow of oil into and out of the shell. No cross baffles are necessary in the shell, thereby resulting in minimum pressure drop of the oil, and the construction of the unit throughout is simple, sturdy, and leakproof.

Standardized Line of Diesel Engines

COVERING power requirements from 50 to 1000 horsepower, in 2- to 8-cylinder units, a new line of 4-cycle direct-injection moderate-speed diesel engines for marine propulsion and auxiliary service recently has been introduced by the Worthington Pump and Machinery Corporation. It is said that the final design of these engines was established only after several years of experimentation and operation under actual working conditions. The result is a series of simple, rugged, dependable, and accessible units incorporating only time-tried features and highly standardized to meet all present needs for small and moderate-powered engines.

Among the many salient features of construction of these diesels are: Individual fuel pumps for each cylinder, with fuel lines of equal length, hydraulically control the injection of fuel; individual air starting pilot valves control the admission of starting air to each cylinder; and spray valves are pressure actuated, no push rods or levers being used. In the larger engines, air inlet and exhaust valves are carried in removable



The new Worthington diesel.

and interchangeable cages, the exhaust valve cages are water cooled; in the smaller engines, these valves (also interchangeable and adjustable) seat directly in the cylinder head and operate in removable bushings.

Lubricating oil is positively circulated by an attached reciprocating pump (regardless of the angle of inclination), through a cast-in main duct in the base with cast-in branches leading to the bottom of each main bearing. From the main bearings, the oil reaches the crank and wristpin bearings under pressure through drilled passages in the crankshaft and connecting rods. Other points requiring lubrication—camshaft gear, governor, etc.—are supplied with oil under pressure from the flywheel end of the main oil duct. In all but the smallest engines, the cylinders are two-point lubricated by force feed.

The camshaft, readily removable at right angles, is driven by spur gears with silent spiral teeth from the flywheel end of the engine. The entire camshaft assembly, including its lubrication, is enclosed with a tight cover. Cooling is provided at all essential points, including the exhaust manifold, the principal feature being that the flow in all jackets is so directed that high water velocities result and there are no dead pockets. A combined water circulating and bilge pump, of the double-acting plunger type, is standard equipment. However, if desired, a centrifugal circulating pump with a separate reciprocating bilge pump can be furnished.

On the smallest engines, the well-known Joes reversing gear and clutch is employed. Larger sizes are fitted with direct reversing gear.

These marine engines are paralleled by a line of four cycle direct injection units for stationary services.

Unusual Speed in Cargo Handling

ON a recent eastbound trip of the Dollar liner *President Coolidge*, it became essential that the sailing schedule of the vessel be advanced one day at San Francisco. This meant that all loading and discharging of cargo would have to be speeded up.

Among other shipments, there were 193 tons of California canned fruit at the Encinal Terminals at Alameda waiting to be shipped on the liner. This tonnage had to be carried across the Bay of San Francisco and spotted on the Dollar docks alongside the *President Coolidge*.

A Bay Cities Transportation Company barge was employed for this work. These barges are equipped with skids in ample quantities and with elevators and trucks. In order to speed up the service on this shipment, three Elwell-Parker gas-electric trucks were pressed into service. The canned fruit was placed on skids, trucked on to the barge, and the barge was towed to the Dollar dock. Here the skid-loads had to be transferred approximately 100 feet from barge to desired location on the pier. Three men, each using an Elwell-Parker truck, transferred the 193 tons in just fifty-five minutes by the watch. This is at the rate of more than one ton per minute per truck. Each truck made sixty power pickups, sixty loaded transfers, sixty set-downs, and sixty return empty transfers in the fifty-five-minute period.

There are many Elwell-Parker electric trucks on the San Francisco waterfront and their efficiency and dependableness under rush conditions have a considerable share in maintaining the ability to make fast "turn-around" for which that port is noted.

Trade Literature

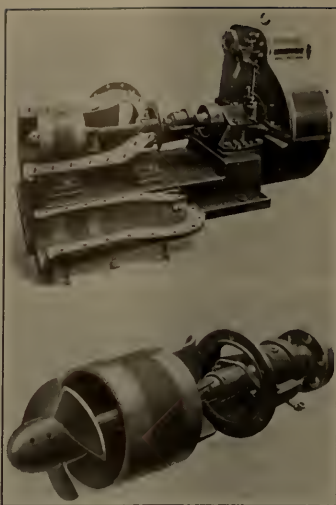
Electric Galley Equipment. A complete line of electric galley equipment is described and illustrated in Special Publication 1952 just issued by the Westinghouse Electric and Manufacturing Company, Mansfield, Ohio. The equipment described includes ranges, bake ovens, broilers, fry kettles, coffee urns, waffle bakers, hot plates, and griddles—an assortment to meet the needs of all types of vessels.

New De Laval Propeller Type Pump

FOR handling relatively large volumes of liquid against comparatively low heads, the propeller type of pump can be operated at rotative speeds which are much higher than those suitable for ordinary centrifugal pumps. In a properly designed pump of this type, the liquid enters and leaves without turbulence or shock and the efficiency is high.

The De Laval propeller pump which is here shown, is built for both horizontal and vertical installation and is available for all capacities and for heads up to about 40 feet. It is suitable for direct connection to a standard speed, electric motor or steam turbine, or a speed reducing gear may be used, according to conditions. Its applications include circulating condenser cooling water, bilge service, and all purposes within the head limitations.

The pump casing consists of two parts which are separated in the plane of the center line of the shaft by a flat joint that is maintained air- and water-tight by a thin paper gasket. The propeller is designed for the specified conditions of capacity, head, and speed and is finished on all surfaces, the blades being carefully filed and scraped to templates to insure the shape required by hydraulic design. The casing around the propeller is protected by a separate sleeve, which can be renewed should wear occur. This sleeve supports the guide vanes by which the liquid is directed in smooth flow-lines. To protect the shaft from wear, a removable



View of the new De Laval propeller type pump with upper half of case removed and a close-up of the impeller and its sleeve.

protecting sleeve is fitted which extends through the stuffing box and provides a bearing surface for the packing.

At the coupling end the shaft is supported by a grease lubricated ball bearing with a separate ball thrust bearing in the same housing. At the propeller end, the shaft is supported by a bearing of the sleeve type.

Notable Knot-Board

HERE is a large knotboard recently completed at the San Francisco mill of the Tubbs Cordage Company. There are over sixty knots, bends, hitches, and

splices illustrated in the Extra Superior Manila Rope mounted on a black, cloth-covered board. Quite a few will be familiar to rope users in general but there are some that, perhaps, only the old salts that sailed as Iron Men in Wooden Ships will recall.

The following knots and splices are illustrated:

Grommet French Whipped
Half Hitch
Two half hitches
Inside Clinch
Fisherman's Bend
Double Diamond
Victory Knot
Single Diamond
Round turn, two half hitches
Studding Sail Tackle Bend
Bowline
Bowline on a bight
Grommet served
Catspaw
Fisherman's Knot
Becket Bend
Double Sheet Bend
Clove Hitch
Granny Knot
Spanish Bowline
Mast Head
Grommet
Overhand Knot
Double Carrick Bend
Shroud Knot
Single Mathew Walker
Double Mathew Walker
Man Rope Knot
Sail Maker's Splice
Eye Splice
Eye Splice Served
Chain Splice
Double Overhand
Figure Eight Knot
Short Splice
Rose Knot
Inside Clinch and Half Hitch
Hangman's Knot
Linesman's Knot
Cross pointing a Hawser
Timberman's Hitch
Single Turks Head
Mathew Walker four strand
Single Carrick Bend
Japanese Knot
Sheep Shank Knotted
Receiving Line Bend
Sheep Shank
French Carrick Bend
Surgeon's Knot
Double Turks Head
Square Knot
Back Splice
Running Bowline
Crabber's Eye Knot
Open Carrick Bend
Hackamore
Chain Knot
Long Splice
Transmission Splice



Some Modern Paint Developments

By Frank W. Dunne,

President, Frank W. Dunne Paint Company

NO industry has such general appeal as the paint and varnish industry. Almost every surface and object we see around us has a protective coating of some kind. From the earliest times paint and varnish have been used, sometimes simply to adorn, sometimes to protect, and often for both purposes.

With modern developments and increase in chemical knowledge, the paint and varnish industry has developed rapidly and is developing even now at such a pace that products are being placed on the market that will do things undreamed of a few years ago. Not very long ago nitrocellulose was looked upon as a product likely to revolutionize the paint industry in the form of quick-drying lacquers. These lacquers had great advantage over the old type finishes inasmuch as they dried very quickly to an intensely hard film. Modern speed did not permit the slowness of drying usual in paints and varnishes, and so lacquer found ready acceptance. However, the introduction of lacquer was soon followed by the sensational synthetic resins developed by Dr. Baekeland and others, which gave finishes incomparably more durable than any other type of varnish, together with a speed of drying far superior to any fossil resin finish and comparable with lacquer.

The old fossil resins, such as Congo, Kauri, and the like, as found in nature, are the products of decomposition and condensation of vegetable matter over a period of ages. Being natural products they varied considerably and nobody could be certain of obtaining consistent results in finishes. Further, varnishes made from them had only a moderate degree of durability as considered nowadays and they were by no means resistant to severe weather conditions.

Dr. Baekeland, working with phenolic compounds and aldehydes, found that he could obtain a resin which had remarkable resistant properties. It would withstand water, acids, and alkalis and could be molded. As a result we have the immense plastic resin industry of today, and it is not difficult to look around in any place and see some object that is molded of bakelite or some other plastic resin. The

product, however, has been improved upon greatly by firms like ourselves through extensive research work on the subject.

It was an obvious step to try to make this type of resin suitable for varnish making, but not at all easy to develop the product so that it would have the durability and resistance of the molded article and still be soluble in, and miscible with, ordinary paint and varnish materials. For fourteen years Dr. Baekeland and his associates worked on this problem before attempting to place the product they obtained on the market. But the result in the varnish industry was sensational. With the use of resins of the phenol formaldehyde type, of which bakelite is the best known and most highly developed, varnishes can now be made which exposure tests show have durability not heretofore approached. Panels coated with these varnishes have withstood exposure to sun and salt water in semi-tropic climates for years without deteriorating.

Varnishes can now be made with an unusually high solid content, so that the material left on the job after the thinner has evaporated is much greater than ever before possible, and, owing to the chemical reaction that appears to take place between bakelite and China wood oil, this combination can be made into varnish at such low temperatures that many of its valuable qualities are now preserved instead of being destroyed by the high heat needed when cooking this oil with fossil resins.

It should be remembered that bakelite varnishes are really definitely compounded and not subject to the variations likely with fossil resins. On the other hand, owing to the fact that we are dealing with special chemical materials, in order to obtain these extraordinarily durable results, it is necessary to remember this when applying bakelite. Many of the difficulties experienced in the past with its application have been due to following too closely the established varnish practice. For instance, a Bakelite varnish containing 60 per cent. solids made at a low heat with China wood oil is thinner in body than a similar varnish containing only 45 per cent. solids made from fossil resin or ester gum at a high

heat. Bakelite reacts with oil forming a thorough drying film which by itself has little adhesion to the job, and so many bakelite varnishes have given trouble in this respect, because the manufacturer did not realize that other ingredients would have to be added to increase the adhesion. Bakelite by itself has more than a tendency to yellow, but later developments have overcome this difficulty, and we now make under our trade mark name of Dunspar Bakelite a varnish that is nonyellowing.

In all the synthetic resin varnishes, whether bakelite or others, there has been a great deal of difficulty experienced through skinning in the container. All these defects, as they have appeared, have been met and overcome by us and we now make Dunspar Bakelite that will dry in four hours, be absolutely waterproof, alkali- and acid-proof, will not yellow, and will not skin in the container, and at the same time have good adhesion. The manufacturer to obtain these results must remember he is dealing with a chemical material in a more or less high state of purity and must develop it along chemical lines.

Probably one of the greatest beneficiaries of this type of varnish is the marine trade, where finishes are now possible that will withstand salt water, sun, and general marine conditions to a degree not heretofore obtainable. The marine trade should, however, bear in mind that a synthetic resin is only the starting point for a satisfactory finish, and unskilled and unthoughtful work can turn out bad varnishes even when compounded of ultra fine material.

To reduce Dunspar bakelite varnish, a high solvent should be used on first coat, particularly in two-coat work. Brushes should be immediately cleaned by this solvent before being put away.

In conclusion, I do not believe any branch of industry as a whole have cooperated as well as the paint industry in the amount of laboratory research and practical development work. The various new pigments and vehicles that have come to the front in the past decade and the results of their efforts are apparent to anyone using paint material.



American Shipbuilding

Edited by H. C. McKinnon

Important Reconditioning Job Under Way.—Craig Shipbuilding Company, Long Beach, California, has two Swayne & Hoyt freighters in its yards undergoing important reconditioning to the machinery and hull. These are the Point Ancha and Point Lobos.

Work on the machinery of these two ships will consist of the installation of a Westinghouse type exhaust turbine on the Point Lobos and of a Bauer-Wach type exhaust turbine, manufactured by the De Laval Steam Turbine Co., on the Point Ancha. Each vessel will have new equipment: A lubricating oil system for the turbines, including coolers, strainers, tanks, suitable valves, thermometers, and a De Laval Oil purifier; a new Westinghouse condensing system, including condenser and air ejector; De Laval, Westinghouse, and Worthington pumps. The boilers are to be equipped with Babcock & Wilcox convection type superheaters. The present power plant of these vessels is the standard United States Shipping Board 2800 indicated horsepower triple expansion engine which produces approximately 2500 shaft horsepower. The installation of the exhaust turbines is figured to give a gain of 28 per cent in horsepower rating with the same steam consumption. The mail contract under which these vessels will be operated calls for a sea speed of 12 knots, which is guaranteed by the builders of the exhaust turbine machinery.

In addition to machinery reconditioning, the vessels will be modified in their quarters to allow for the accommodation of eight or ten passengers. Work on these vessels will probably be completed toward the end of October.

Tug Converted To Oil Burner.—The 34-year-old U.S. Army tug *Slocum*, which is operated on San Francisco Bay by the Army Quartermaster Corp., has been converted from a coal to oil burner by The Moore Dry Dock Co., Oakland. Practically all the old structural members in way of the former coal bunkers and coal hatches were re-

moved and new welded oil-tight steel bunker tanks were installed, with the necessary manholes, ladders, steam-heating coils, brass bleeder plugs, gauges, pipes, etc. The tug has two cylindrical fire-tube boilers, each fitted with three furnaces. Six Ray rotary oil burners were supplied for these furnaces.

In addition to the reconditioning of the boilers, considerable repair and renewals were performed on the hull, putting this fine tug in excellent shape for another long stretch of useful harbor work.

Improvements for Mare Island.—The Navy Department has announced that \$853,000 will be spent in the near future for improvements at the Mare Island Navy Yard on San Francisco Bay. The appropriation is part of a \$10,000,000 construction program provided by the navy department. Included in the improvements to the Mare Island yard are:

Improvements of power plants, \$325,000; extension of Dike No. 12, \$250,000; distributing systems, \$60,000; paving Railroad Avenue, \$40,000; improvement of railroad tracks, \$25,000; oil tanks at submarine repair base, \$18,000.

Other Pacific Coast construction work at navy stations include \$1,729,000 to be expended for Pearl Harbor, Hawaii; \$300,000 for San Diego; and \$500,000 for the Puget Sound Navy Yard at Bremerton.

Vessel Sold; to be Converted.—J. E. Barnes of Washington, D.C., is reported to have purchased the former Alaska cableship *Dellwood* from the United States Shipping Board for \$20,000 with the understanding that the vessel will be converted into a cannery tender for Alaska service with restrictions against operation in coastwise or intercoastal trade. It is estimated that the conversion job will cost in the neighborhood of \$75,000. The vessel is now laid up at Seattle.

Santa Lucia to be Launched.—The third fine passenger and

freight liner for the Panama Mail Service of the Grace Lines, Inc., will be launched from the yards of the Federal Shipbuilding & Drydock Co., Kearny, New Jersey, on October 3, when the steamship *Santa Lucia* will be sent down the ways. The vessel will be christened by Miss Hilda Holloway, 12 year old daughter of William Grace Holloway, vice-president of W. R. Grace & Company. She is the descendant of a race of ship masters. Her great grandfather, William Russell Grace, was a pioneer in shipping circles, and founded the company.

The vessel, like her sister ships *Santa Rosa*, *Santa Paula*, and *Santa Elena*, is 484 ft. between perpendiculars, 72 ft. beam, 26 ft. 1 in. loaded draft. She will be powered by steam turbines developing 12,600 indicated horsepower, which will give her a speed of 18.5 knots. The vessels will be operated in the Central America, Mexico, Panama, Cuba service, with ports of call including New York on the East coast of the United States and all the leading American and Canadian ports on the West Coast. The first vessel, the *Santa Rosa*, is scheduled to arrive on the Pacific Coast on her maiden voyage in December.

Shipyards Rental Dispute Settled.—After several months of extensive conferences and negotiations, the rental on the 68.5 acre tract occupied by the Los Angeles Shipbuilding & Drydock Corporation at San Pedro, in the Los Angeles Harbor West Basin area, has been set at \$21,750 a year until 1942. This rate was set by a board of arbitration. The harbor department last February levied a rental of \$45,000 a year against the shipyard property, on which the corporation had been paying only \$100 a year since its establishment in 1917 as a war emergency enterprise. The board of arbitration consisted of Chief Engineer George F. Nicholson of the Los Angeles Harbor Board and Allen C. Stelle, secretary-treasurer of the Los Angeles Shipbuilding and Dry Dock Corporation.

Important Launchings.—Among the recent launchings of fine cargo and freight liners in American shipyards, the most important was that of T.S.S. *Washington*, sister ship of the *Manhattan*, which slid down the ways at the Camden, New Jersey plant of the New York Shipbuilding Company on August 23. She was christened by Mrs. T. V. O'Connor. The event was witnessed by about 12,000 persons. Brief addresses were made just before the launching by T. V. O'Connor, chairman U.S. Shipping Board; C. L. Bardo, head of the New York Shipbuilding Co.; John M. Franklin, vice-president of the Roosevelt Steamship Co.; and P. V. G. Mitchell, vice-president in charge of passenger traffic.

The *Washington*, like her sister ship *Manhattan*, has a length overall of 705 feet; length between perpendiculars, 685 feet; 86 feet molded beam; and 75 feet depth to promenade deck. The vessel will be powered by steam turbines. She will have a capacity for 380,000 cubic feet of general cargo, 47,000 cubic feet of refrigerated cargo; and 19,200 cubic feet of mail. Accommodations will be provided for 582 in cabin class, 461 in tourist class, and 196 in third class. The *Washington* will be ready for service in the North Atlantic run by next summer.

T. S. S. Colombia, a combination passenger and freight vessel, building for the Colombian Mail Steamship Corp., of New York, by the Newport News Shipbuilding and Drydock Company, was launched August 6 at Newport News, Virginia. The vessel will be delivered about the end of this year. She is 404 ft. 3 in. length over-all, 57 ft. 6 in. beam, and is powered by steam turbines to give her a speed of 16 knots. The vessel will cost \$2,300,000.

A launching of considerable interest in the cargo trade is that of *Seatrain New York* September 14 at the Chester, Pennsylvania plant of the Sun Shipbuilding & Drydock Company. This is a seagoing carrying vessel for Seatrain Lines, Inc., of New York and New Orleans, and is the first of two sister ships building for operation between New York, Havana, and New Orleans. The vessels are fully described in another section of this issue.

To Convert Vessel.—The Cary-Davis Tug & Barge Co., Seattle, recently purchased the U.S.S. Gen-



Launching of the Steamship *Colombia* at the yard of the Newport News Shipbuilding and Dry Dock Company.

eral Mifflin, supply ship from the U.S. Army Quartermaster Corp. The vessel will be converted to a towboat and, when ready, will be one of the largest and most powerful in the Northwest.

The *General Mifflin* was built in San Francisco in 1904. She is 130 ft. over-all, 27 ft. beam, and of 406 tons gross. She is powered by a 600-horsepower steam engine with oil burning boilers.

Will Build Tug.—The Lewis Coal & Oil Co., Port Washington, Long Island, N.Y., recently received bids from several yards for the building of the hull of a 64-ft. steel hull, diesel-powered, combination tug and oil carrier. Arc-Weld Shipbuilding Co. was low bidder at \$23,500 and 90 days. Brown & Demarest are architects.

Buys Shipyard.—The shipyard at Bath, Me., which has been leased for the past five years by the Bath Iron Works Corporation, has been purchased from the New Eng-

land Public Service Company and the Keyes Fibre Company by the corporation, according to W. S. Newell, president.

The Maine yard is one of the outstanding shipbuilding plants in the United States, and since its reorganization, late in 1927, it has turned out nearly a score of private yachts. It also has constructed half a dozen or more trawlers, seven 165-foot patrol boats for the U. S. Coast Guard, and soon will start construction work on the new 1500-ton U.S. Navy destroyer *Dewey*.

Freights & Charters

September 21, 1932.

THE following steamers have been fixed with grain to the United Kingdom: Japanese steamer *Pacific Maru*, San Francisco to Avonmouth and Leith, August, Strauss & Co.; British steamer *Koranton*, Vancouver, B.C., to London, September, Dale & Co.; British steamer *Grainton*, Vancouver, B.C., to Avonmouth, September, Dale & Co.; Dutch steamer, *Victoria*, B.C., to U.K. Cont., 21/3, October; Norwegian steamer *Beljeanne*, Vancouver, B.C., to Europe, Aug. September, Canadian Transport Co.; British steamer *Benlawers*, Vancouver, B.C., to Rotterdam, Leith and Middlesborough (previously reported as *Benladi*), September, A. B. Graham; Dutch steamers *Flensburg* and *Maasburg*, Vancouver or Victoria, B.C., to U.K. Cont., 21/3, October, Canadian Cooperative Wheat Producers Association; British steamer *Frumenton*, Vancouver, B.C., to Avonmouth, September, Dale & Co.; A Smith Steamer, Vancouver, B.C., to U.K. Cont. (Bordeaux, Hamburg Range), 23/6, October, L. Dreyfus & Co.; A Steamer Vancouver, B.C., to U.K. Cont., \$2.35 (Canadian), November, Canadian Cooperative Wheat Producers Association.

The following steamers have been fixed with grain to the Orient: A Steamer, *Prince Rupert*, B.C., to Shanghai, \$2.42½, September; Norwegian motorship *Danwood*, Prince Rupert, B. C., to Shanghai, \$2.42½, September; Norwegian motorship *Snestad*, Vancouver, B. C., to Shanghai, \$2.40 (Canadian), October, James Richardson & Sons.

The American motorship *Lake Oswega* has been fixed from North Pacific to U.S. North of Hatteras, August, by Brady Ketchum Lumber Co.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of September 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W. Seattle, Wn.
Not named, wooden hull, stern-wheel, river steamer for Alaska Railroad, Dept. of Interior, Bell St. Terminal, Seattle, Wn.; 235 L.O.A.; 210 L.B.P.; 6 ft. depth; 3'6" draft; 2 tan. comp. steam engs.; wood-burning boilers; 100 pass.; 300 tons freight; keel 7/13/32; deliver 5/10/33 est.

THE MOORE DRY DOCK CO.

Oakland, Calif.

Hull 182, floating crane for Mare Island Navy Yard, for U. S. Navy, Bureau of Yards and Docks; 100 x 45 x 3'10"; 374 gr. tons; keel 10/32 est.; launch 11/32 est.; deliver Dec./32 est.

Hull 183, floating crane, same as above, for San Diego Operating Base; keel 10/32 est.; launch 11/32 est.; deliver 12/32 est.

U. S. NAVY YARD, Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 10/2/32 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD, Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31; deliver 2/11/34 est.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint: tug Restless, Drydock, clean, paint, misc. repairs: stmr. Watsonville, stmr. Hamlin F. McCormick, stmr. Forbes, stmr. Maunawili, President Lincoln, stmr. Brookings, stmr. Everett. Engine, boiler, hull, and steward's dept. repairs: stmr. West Ivis. Miscellaneous: launches Patriotic, Linde, Standard 11, Ubuyu Maru, Monterey, Daiho No. 2, stmr. Norman Star, whaling stmr. Clemente, stmr. Montebello, stmr. La Brea, m.s. Brunswick, stmr. Cricket, stmr. Tascalusa, stmr. La Placencia, fish boat Greenland, stmr. Voco, stmr. Diamond Head, stmr. Talamanca, m.s. Hawaiian Standard, tug Gov. Irwin, Gove, Makham, stmr. Chiriqui, stmr. Antigua, stmr. Monowai.

GENERAL ENGINEERING & DRY- DOCK CO., Oakland, Calif.

Installation of water-tube boilers, oil-burning equipment, reconditioning, etc.: Lightship No. 76.

Drydocked, voyage repairs, cleaned, and painted: stmr. Santiam. Drydocked, repairs to damaged tailshaft: gas s. Surf. Drydocked, misc. repairs: stmr. Wellesley.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Docked, cleaned, painted, misc. hull re-

pairs: barge Pioneer. Docked, cleaned, painted, misc. hull and engine repairs: 4 fishing boats. Misc. hull and engine repairs not requiring docking: 16 fishing boats.

TODD DRY DOCKS, INC., Harbor Island, Seattle, Wn.

Drydock for survey: stmr. Charles Nelson. Drydock, misc. repairs: stmr. Condor, stmr. Point Reyes. Voyage repairs: stmr. President Cleveland. Misc. repairs: stmr. Grays Harbor, stmr. S. A. Perkins.

U. S. NAVY YARD, Bremerton, Wn.

Repairs and docking: Arizona, West Virginia, Pennsylvania. Detroit, Cincinnati. Misc. repairs: Omaha. Docking: Litchfield. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY, Pittsburgh, Pa.

Purchasing Agent: W. G. A. Millar.
12 barges for American Barge Line Co., Louisville, Ky.; 158 x 35 x 11 ft.; 182 net tons steel each; 4 delivered; 8 delivered 8/19/32.

BATH IRON WORKS Bath, Maine

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed; deliver 6/11/34 est.

Not named, hull 155, quarantine tug for U. S. Public Health Service, Boston; 60 ft. long; 15 ft. beam; 7 ft. depth; keel 7/24/32.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington, D.C.; 131 long; 24'6" molded beam; 8'6" molded draft; 500 H.P. eng.; keel 8/20/32.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT, Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement; deliver 8/15/32 est.

Lurline, hull 1447, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/32; deliver Jan./33 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed; deliver 2/11/34 est.

CHARLESTON DRY DOCK & MACHINERY CO., Charleston, S.C.

Wylie L. Moore, all welded river towboat for Pure Oil Co., Chicago, for Savannah River; 240 H.P. Worthington diesel eng.; Keck Gonnerman stern wheel drive;

keel 7/28/32; launch 9/32 est.; deliver 10/32 est.

DEFOE BOAT & MOTOR WORKS Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.
Escanaba, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W-T boilers; keel 12/15/31; launch 9/17/32 est.; deliver 11/10/32 est.

DRAVO CONTRACTING COMPANY, Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hull 1139, steel hull, 20-in. pipe-line, self-propelled, diesel-electric powered dredge for U. S. Engineers Office, St. Louis, Mo. Hull 1140, same as above.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self-propelled 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.

Myrtle, lighthouse tender for U. S. Dept. of Commerce, Bureau of Lighthouses; 93x 23x5 ft.; 2 Atlas-Imperial diesel engs.

ELECTRIC BOAT CO., Groton, Conn.

Cuttlefish, fleet submarine SS171 for U. S. Navy; hull 7/31; deliver 12/29/33 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'11" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32; deliver 10/10/32 est.

Santa Paula, hull 122, sister to above; keel 8/4/31; launched 6/11/32.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch 10/3/32 est.

Santa Elena, hull 124, sister to above; keel 3/24/32.

HOWARD SHIPYARDS & DOCK COMPANY, Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft.; keel 3/21/32; launched 5/31/32; delivered 8/5/32.

MARIETTA MANUFACTURING CO., Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.; 132 x 35 x 10 ft.; 8 delivered; deliver balance 8/1/32 est.

Hull 288, steel fuel barge for Campbell Transportation Co., Pittsburgh, Pa.; 110 x 24 x 8 ft.; deliver Oct./32 est.

MIDLAND BARGE COMPANY, Midland, Penn.

Huckleberry Inn, tunnel-stern, stern-wheel, diesel powered towboat for Inland Waterways Corp., Washington, D.C.; 160 hp, 50 ft by 8 ft depth, two 590 BHP McIntosh & Seymour diesel engs.
Tom Sawyer, same as above

NASHVILLE BRIDGE COMPANY, Nashville, Tenn.

Purchasing Agent: R. L. Baldwin.
Shenango, hull 265, gas launch for U. S. Engineers, Pittsburgh; 40 x 8 x 8 ft.; keel 4/27/32, launched 6/10/32 delivered.

Hull 766, 31 ft. workboat for U. S. Engineers, Nashville, keel 6/1/32, launched 7/10/32; delivered 7/25/32.

Hull 267, deck barge, owner not named; 130x50x9 ft. delivered 8/25/32.

Hull 268, same as above, delivered 8/25/32.

Hull 269, same as above, delivered 8/25/32.

Hull 270, same as above, delivered 9/3/32.

Hull 271, same as above, delivered 9/3/32.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Columbia, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp., New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/29/32, launched 8/6/32; deliver 12/1/32 est.

Haiti, hull 348, sister to above; keel 4/4/32, launched 9/17/32; deliver 12/15/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept; keel 9/26/31; deliver 5/1/34 est.

Peten, hull 354, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 S.H.P.; keel 3/9/31; launched 8/15/31. Reconditioning; deliver 2/26/33 est.

NEW YORK SHIPBUILDING CO.

Camden, N. J.

Purchasing Agent: J. W. Meeker.
Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar 31/30; launched 11/7/31; deliver 10/15/32 est.

Washington, hull 406, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 1/20/31 launched 8/20/32.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section expansion boilers; keel 9/3/31, deliver 3/3/34 est.

THE PUSEY & JONES CORP., Wilmington, Del.

Purchasing Agent: James Bradford
Arbutus, hull 1057, lighthouse tender for U. S. Department of Commerce, Bureau of

Lighthouses, 163'6" L.B.P., 32 beam, 10'7" mean draft, two triple exp steam engs, 2 W.T. boilers, 200 lbs. working pressure contract signed 7/14/32.

Lilac, hull 1058, twin screw, steel, steam propelled lighthouse tender for U.S. Dept. of Commerce, Bureau of Lighthouses, 163'6" L.B.P., 32 beam, 8'6" loaded draft, 13 kn speed, two T.E. steam engines, 850 I.H.P., 2 water tube boilers, 200 lbs. pressure.

SPEEDEN SHIPBUILDING CO., Baltimore, Maryland

Purchasing Agent: W. J. Collison

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y., 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng., keel 3/15/32, launched 8/16/32, deliver 10/31/32 est.

Not named, hull 273, diesel tug for U. S. Public Health Service, New Orleans, La.; 71 L.B.P.; 16'11" beam, 8' depth, 210 BHP Fairbanks-Morse diesel eng.; completion 250 days, keel 7/20/32.

SUN SHIPBUILDING & DRY DOCK COMPANY, Chester, Penn.

Purchasing Agent: H. W. Scott.

Seatrain New York, hull 146, single-screw steamship for carrying loaded railway cars for Seatrans Lines, Inc., New York and New Orleans, 464'6" by 63'6" by 38'3"; 15½ knots speed, 8500 DWT; keel 2/24/32, launch 9/14/32 est. deliver 9/32 est.

Seatrain Havana, hull 147, sister to above; keel 2/24/32, launch 9/24/32 est. deliver 9/32 est.

UNITED DRY DOCKS, INC.

Mariner's Harbor, Staten Island, N.Y.

Purchasing Agent: W. Clute

Evelyn, hull 810, tanker for Matoil Service Transp. Co.; 64 L.O.A.; 16 beam, 8 depth; 8 M.P.H. speed, 100 BHP diesel eng.; keel 7/25/32, launched 9/3/32, deliver 9/12/32 est.

Helen, hull 811, oil barge for Matoil Service Transp. Co.; 109x36x11 ft., keel 7/25/32, launch and deliver 9/15/32 est.

Doris, hull 812, same as above, keel 7/25/32, launch and deliver 9/15/32 est.

Wistaria, hull 813, tender for U.S. Dept. of Commerce, Bureau of Lighthouses, 121'4" L.O.A., 25 beam, 9 draft, 9½ knots speed, diesel electric drive, 240 S.H.P., keel 10/11/32 est.; launch 1/17/33 est. deliver 2/28/33 est.

U. S. NAVY YARD, Boston, Mass.

MacDonough, U. S. Torpedo Boat Destroyer DD 351 for U. S. Navy, 340 ft. long, 35 knots speed, complete 8/11/34 est.

U. S. NAVY YARD New York.

New Orleans, light cruiser CA32, for U. S. Navy, 10,000 tons displacement, deliver 6/2/33 est.

Not named, U. S. Torpedo Boat Destroyer (DD 350) for U. S. Navy, 340 ft. long, 35 knots speed, complete 6/11/34 est.

U. S. NAVY YARD Philadelphia, Pa.

Minneapolis, light cruiser CA36 for U. S. Navy, 10,000 tons displacement, deliver 10/2/33 est.

U. S. NAVY YARD Portsmouth, Va.

Cachalot, fleet submarine SS170 for U. S. Navy, deliver 9/16/33 est.

(Continued from Page 385)

The Norwegian steamer Dagrun has been fixed from North Pacific to U.K., September-October, Canadian Transport Co.

The Norwegian steamer Tigre has been fixed from North Pacific to U.K. Cont., merchandise, Oct., Johnson Line.

The Swedish motorship Sunbavik has been fixed from San Francisco to London and Liverpool, berthed, September, Furness Line.

The following time charters have been reported: Norwegian motorship Dagfred, 2 to 4 months, delivery Colon, redelivery U.K. Cont., Sept., W. L. Comyn & Sons; Swedish motorship Pajala, 1 trip, delivery North Pacific, redelivery U.K. Cont. (Bordeaux-Hamburg range), 5/3, Sept., Oct.; Norwegian motorship Nyhorn, 1 trip, delivery U.S. North of Hatteras, redelivery U.K. Cont. (Bordeaux-Hamburg range), 6/-, August, Canadian Transport Co.; Chilean motorship Tolten, 1 trip, delivery North Pacific, redelivery U.K. Cont. (Bordeaux-Hamburg Range), 6/-, Sept., Canadian Transport Co.; Pan motorship Granville, 1 year, Pacific Coast-European service, October, Fred Olsen Line; British steamer Bonnington Court, 3 to 6 months, delivery British Columbia, Sept.; Norwegian motorships John Bakke and Samuel Bakke, delivery British Columbia, redelivery U.K. Cont., October, W. L. Comyn & Sons; Danish motorship Stensby, delivery North Pacific, redelivery U.K. Cont., Sept., H. R. MacMillan & Co.; Norwegian motorship Brand, delivery North Pacific, redelivery U.K. Cont., 6/-, October, W. L. Comyn & Sons; Swedish motorship Svedrott, delivery North Pacific, redelivery U.K. Cont., November, W. L. Comyn & Sons; British steamer Elmworth, 1 trip, delivery British Columbia, redelivery U.K. Cont., 6/-, October, Canadian Transport Co.; British steamer Trentbank, 1 trip, delivery British Columbia, redelivery China, 4/10/-, Sept., Canadian Transport Co.; Norwegian motorship Nordvard, delivery Panama Canal, redelivery U.K. Cont., via North Pacific, 4/5 September, W. L. Comyn & Sons; Danish motorship Guldborg, delivery via Colon, redelivery U.K. Cont. via North Pacific, 4/-, October, W. L. Comyn & Sons; British motorship Oakworth, 1 trip, delivery North Pacific, redelivery U.K. Cont., 6/3, October.

PAGE BROTHERS,
Brokers



Marine Insurance

American Marine Insurance

*A Short Summary of the Annual Survey of Marine Insurance Business
Written within the United States*

THE survey of marine insurance written by domestic and foreign companies in the United States during calendar year 1931 has just been completed. A summary of this survey indicates that the hull insurance market for American underwriters has remained about the same as for 1930, that there was a substantial drop in cargo insurance premiums received by both American and foreign companies, and that American shipowners are sending ocean-going hull insurance premiums direct to foreign markets in large amounts.

Reports have been received from sixty-four domestic companies and twenty-seven foreign admitted companies. Premiums received by domestic companies amounted to \$36,126,000 as compared with \$40,315,000 for 1930 and by admitted foreign insurance companies, \$7,011,000 as compared with \$10,425,000.

After allowing for reinsurance with nonadmitted foreign insurance companies, the total net premiums received within the United States by all companies amounted to \$38,173,000 as compared with \$44,202,000 in 1930. The decrease in premiums was almost entirely in cargo insurance. Premiums on hull insurance written by domestic companies (including Shipping Board Fund) amounted to \$20,628,000 as compared to \$19,407,000 in 1930.

American Insurance Companies

Of the \$36,126,000 received as original premiums, 47 per cent. was for cargo insurance and 53 per cent for hull insurance as compared with 54 per cent and 46 per cent., respectively, for 1930.

Hull insurance premiums reported by the American Marine Insurance Syndicates (which represent the

American hull insurance market) amounted to \$6,892,000 for ocean-going hulls and \$996,000 for Great Lakes, as compared with \$6,809,000 and \$1,249,000, respectively, for 1930.

TOTAL PREMIUMS, REINSURANCE, AND NET PREMIUMS

	1929	1930	1931
Insurance Premiums Reported:			
By American companies.....	\$67,356,000	\$60,069,000	\$51,777,000
Reinsurance (deduct).....	21,477,000	19,754,000	15,661,000
Total American premiums.....	\$45,779,000	\$40,315,000	\$36,126,000
By Foreign companies.....	\$30,537,000	\$25,300,000	\$18,334,000
Reinsurance (deduct).....	15,874,000	14,875,000	11,323,000
Total Foreign premiums.....	\$14,663,000	\$10,425,000	\$7,011,000
Total original premiums— American and Foreign..	\$60,442,000	\$50,740,000	\$43,137,000

Cargo Premiums Reported:

By American companies.....	\$41,603,000	\$33,466,000	\$24,534,000
Reinsurance (deduct).....	14,671,000	12,560,000	9,036,000
Total American Cargo Premiums.....	\$27,132,000	\$20,906,000	\$15,498,000
By Foreign companies.....	\$22,209,000	\$16,770,000	\$10,605,000
Reinsurance.....	11,122,000	9,382,000	6,730,000
Total Foreign Cargo Premiums.....	\$11,087,000	\$ 7,388,000	\$ 3,875,000
Total Cargo Premiums.....	\$38,219,000	\$28,296,000	\$19,373,000

Hull Premiums Reported:

By American companies.....	\$29,453,000	\$26,601,000	\$27,243,000
Reinsurance (deduct).....	6,606,000	7,104,000	6,615,000
Total American Hull Premiums.....	\$18,647,000	\$19,407,000	\$20,628,000
By Foreign companies.....	\$ 8,328,000	\$ 8,530,000	\$ 7,729,000
Reinsurance.....	4,752,000	5,465,000	4,233,000
Total Foreign Hull Premiums.....	\$ 3,576,000	\$ 3,065,000	\$ 3,496,000
Total Hull Premiums.....	\$22,223,000	\$22,444,000	\$23,764,000
GRAND TOTAL CARGO AND HULL PREMIUMS....	\$60,442,000	\$50,740,000	\$43,137,000
Reinsurance with Foreign Non-Admitted Companies....	\$ 8,696,000	\$ 6,539,000	\$ 4,564,000
NET PREMIUMS WITHIN UNITED STATES.....	\$51,746,000	\$44,202,000	\$38,173,000

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HEAD OFFICE

1900, 1901, 1902

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Admitted Companies	\$ 9,141,000	\$ 8,141,000	\$ 8,141,000
Non-Admitted Companies	5,799,000	1,141,000	1,141,000
Total	\$14,940,000	\$9,282,000	\$9,282,000

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ON THE

American companies	\$ 5, 1, 00	\$ 4, 17, 484	\$ 5, 00, 447
Foreign Associated Companies	\$ 5, 3, 00	\$ 4, 36, 378	\$ 2, 73, 333
Foreign Associated Companies	\$ 5, 3, 00	\$ 4, 36, 378	\$ 2, 73, 333
Total	\$ 10, 4, 00	\$ 8, 53, 862	\$ 7, 73, 780

Domestic companies reinsured hull business with foreign admitted companies in the amount of \$3,515,000 and with foreign nonadmitted companies in the amount of \$1,429,000. They reinsured cargo business with foreign admitted companies of approximately \$4,000,000 and with nonadmitted foreign companies of approximately \$2,182,000. In each case the total of amounts reinsured with admitted and nonadmitted foreign countries was approximately the same as was reinsured with domestic companies. About ten per cent. of all original premiums received by domestic com-

Foreign Admitted Insurance Companies

Foreign admitted insurance companies reported total original premiums as \$7,011,000 of which 55 per cent. was for cargo and 45 per cent. for hull premiums as compared with 70 per cent. and 30 per cent. respectively, in 1930. Cargo premiums were only \$3,875,000 as compared with \$7,388,000 for 1930. The hull premiums were approximately the same as for last year.

Foreign nonadmitted companies received by way of reinsurance from American companies premiums amounting to \$3,612,000 and from admitted foreign companies \$1,353,000. In addition to these premiums, shipowners in the United States reported that they placed hull and disbursement insurance directly with foreign companies abroad to the extent of \$6,834,000.

Obituary

JOHN MARSHALL, Jr. died September 18, aged 65 years. Born in Glasgow, Scotland, in 1867, John Marshall came to San Francisco with his parents in his early youth. He began his insurance career as an office boy in an agency office in San Francisco, later going to Chicago and New York to become prominently connected with the Royal Exchange Assurance. In 1900 he joined the Fireman's Fund and in 1919 was elected director and vice-president, retiring in 1928.

HENRY FAULL died August 23. Sales manager and treasurer of the Hammond Lumber Company of San Francisco, Henry Faull was a prominent and useful figure in the councils of the Pacific Coast Shipowners' Association. He died very suddenly of heart attack while on a fishing trip.

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Diesel Engine Operation

III. The Cooling System

*By H. A. Shawk**Chief Lubricating Engineer, Associated Oil Company*

THE method employed and efficiency of the cooling system on diesel engines are, of course, of great importance.

The character of water supplied for cooling purposes is often the cause of many engine and lubrication failures. Endless expense to the owners and trouble for the engineer in charge are only part of the difficulties which might be named. Any water which contains lime, calcium salts, magnesium chloride, sodium salts, sodium sulphate, gases, or organic matter will form scale.

Various methods of water purification are in vogue. In the marine field we are concerned chiefly with sea water and its principal constituent, sodium salts.

Sea water has the following characteristics:

35 cubic feet weigh 1 ton.

1 cubic foot weighs 64 pounds.

Sea water contains 1 20 part air at atmospheric pressure.

Sea water contains 5 ounces of salt per gallon, or 1 33.

Point of saturation in feed water is 12 33, or 60 ounces of salt per gallon of water.

Boiling point of sea water is 213.2 degrees Fahrenheit, and increases 1.2 degrees for every 1 33 of salt content.

When sea water is used for cooling purposes, the heating causes the precipitation of sodium salts on the water jacket walls and the cooling system in general. This in time forms a heavy brittle scale which is a nonconductor of heat and greatly retards radiation from the combustion temperatures into the cooling water. The heat then is dissipated to the cylinder walls and pistons, causing carbonization of lubricating oil, distortion of pistons, plugging of oil ways, sticking piston rings, scored pistons and cylinders, and all sorts of difficulties.

Scale deposits most rapidly where the greatest heat is encountered and when the velocity in circulation is lowest; hence it will be observed that scale is built up in unequal thicknesses, causing hot spots.

The only remedy to employ in using salt water cooling is frequent inspection and sealing. This should be done as often as possible. Some vessels are provided with fresh water cooling systems, which overcome the scale question but cause pitting.

Circulation

Cooling water at the inlet should be as low in temperature as possible. In starting up a new job the circulating water should be closely watched. Rapid change in the outlet or overboard discharge indicates trouble. Before starting, the circulating pump should be primed and all lines should be known to be free and ready for service. Thermometers should be installed in both inlet and outlet lines and all temperatures recorded at half hour intervals.

Air pockets often cause trouble in circulation and the water jacket circulating pump and all low pockets in the line should be purged to free any entrained air. Structural

difficulties are often the source of overheating. This condition may be caused by: heavy lugs and ribs between cylinder walls and water jacket; dead spots in circulation which generate steam; circulation too slow; water jackets too small; cylinder walls too thick; circulation between cylinder head and jacket inadequate; water jackets not covering entire surface exposed to expansion stroke; pockets in water jacket which fill up with mud or scale; and many other factors which should be carefully investigated. Extremely heavy pistons do not readily radiate heat and often contribute to overheating. The cooling water system is of great importance and a careful study of conditions is always advisable.

Trade Literature

De Laval Steam Turbine Company, Trenton, N. J., has recently issued Catalog B 4 describing its Centrifugal Pumps for Large Outputs, as in water works, pumping stations. The distinguishing features of these single stage, double suction pumps include a casing split horizontally in the plane of the axle of the casing so that the internal parts are at once accessible upon removing the casing cover, and the protection of the main members of the pump at points where wear may occur by renewable wearing parts. The various types of pump are clearly illustrated.

De Laval Single-Suction Multi-stage Pumps, Catalog B 5, has just been issued by the De Laval Steam Turbine Company, Trenton, N. J., describing this line of pumps, which are built with as many as seven stages in one casing and for head up to or exceeding 1600 pounds per square inch.

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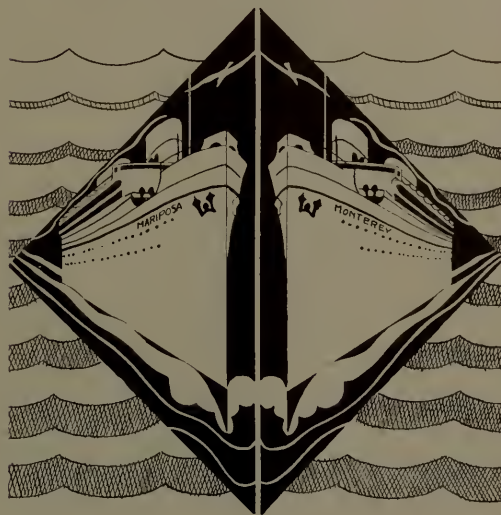
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Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER

Marine Man On Ballot.—California shipping and maritime men are expressing keen interest in the campaign which will result in the selection of a new senator to uphold the state's maritime welfare, as one of their own group, Tallant Tubbs, is the Republican nominee.

This Californian might very well be characterized as a member of the "waterfront" industry, for he comes of a family which has been identified with maritime affairs since the era of the wooden clippers which raced around the Horn, making the colorful history of California's early shipping days. His grandfather, A. L. Tubbs, and grand uncle, Hiram Tubbs, founded a ship chandlery business in '49, and seven years later organized the Tubbs Cordage Company, which is today one of the nation's largest cordage manufacturing firms.

During his own career thus far, Tallant Tubbs has witnessed the many trends of merchant marine operation with the advent of the modern steam, electric, and motor liners which constitute the present commercial strength of the Pacific Coast. The safeguarding and advancement of this great merchant fleet depend greatly on beneficial legislation at Washington and this senatorial candidate is pledging his full support and cooperation, in event of election, to Pacific shipping lines who have such a tremendous investment in merchant tonnage.

Tallant Tubbs is particularly studying the pros and cons of important shipping bills presented at the last session of Congress, including the proposed acts for authorizing the shipping board to grant moratoria to certain steamship companies on repayments of construction loans, the so-called "fighting ship" bill, the alien seaman's deportation proposal, and the mail-contract plan. His close interest in Pacific maritime welfare would forecast intelligent and helpful aid to his Pacific maritime constituency.

Marine Service Bureau. — The Marine Service Bureau for Los Angeles Harbor held its annual meet-



Tallant Tubbs, well known to Coast shipping interests.

ing and banquet last month at the Los Angeles Athletic Club and reported 1546 longshoremen registered, a decrease of only 238, and the assignment of 2019 seamen compared with 2937, from 5150 registrations. Lost-time accidents for the past year were reported at the lowest in the history of the association as a result of the Safety First campaign being carried on.

E. A. Mills was appointed chairman for another year. William Groundwater was elected first vice-chairman and Captain Harry H. Birkholm second vice-chairman. Edwin Nichols continues as local manager. The Marine Service Bureau is made up of five representatives from the Shipowners' Association of the Pacific Coast, the Pacific American Steamship Association, and five stevedoring firms.

New San Francisco Shipping Commissioner. — Captain John A. Rylander has been appointed Shipping Commissioner for the Port of San Francisco to succeed Walter MacArthur, retired.

Captain Rylander is well known at San Francisco, having been a resident of that city prior to his appointment in 1928 as Shipping Commissioner at San Pedro. He

served in the merchant marine for twenty five years, the last ten as a shipmaster, chiefly with the Isthmian Line. His last ship before joining the government service was the freighter Steelmaker. During the late war, Captain Rylander served as a naval lieutenant in the overseas transport service. He was executive officer of the steamship Buena Ventura when she was torpedoed by a German U-boat and sank 250 miles off the Spanish Coast with the loss of 21 men.

His many friends at San Francisco are glad to see him back in this new capacity of Shipping Commissioner, and his late associates at San Pedro extended to him their sincere congratulations.

Allan Woodruff, who was deputy shipping commissioner at San Pedro under Captain Rylander, has been appointed to succeed the latter at the San Pedro office.

Chief on Vacation. Edwin Williams, chief engineer of the steamship Chiriqui of the United Fruit Line, returned aboard the last time the vessel docked at San Francisco. The Chief enjoyed a well earned vacation for two round trips.

Port Traffic Manager.—In preparation for the enlarged scope of shipping that is expected to be covered by the new Port of Stockton when this deep-sea port is completed in a few months, the City of Stockton has appointed C. O. Burgin as traffic manager. He was for the past seven years associated with the Encinal Terminals in Alameda, and prior to that time was with the Luckenbach Steamship Company and the old Pacific Mail Steamship Company.

Golf Is King. — With the president of the company to set the example, all worthy members of the organization of the American-Hawaiian Steamship Company must sooner or later become golf addicts. In order to encourage this fine healthy sport the employees get together semi-annually for a tournament.

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The third semi-annual golf tournament of the American-Hawaiian Steamship Company will be held on October 9 at the Oak Knoll Country Club at Oakland. The tournament is to be an elimination medal play. Half of the players are to be eliminated October 9, the balance in the forenoon of October 16. Those left in the tournament will then play for the President's Cup in the afternoon of the same Sunday.

Prizes will consist of the President's Cup for low net and a suitable cup for runner-up, with prizes for high gross score and for low net on each foursome. Employees of the American-Hawaiian Steamship Company, the Williams Steamship Corporation, and Oceanic and Oriental Navigation Co. are eligible. There will be a guest flight for visitors.

Chairman in charge of entries and reservations is Bert Camp. Fred Ritchie will take care of all handicaps, and John Pruner is in charge of prizes and trophies.

Proud of His Ship. — Chief Engineer S. Kondo, of the Mitsubishi Shoji Kaisha motorship San Pedro Maru, is a well-known figure on the San Francisco waterfront. For eighteen months as first assistant on the San Diego Maru, two years as chief of the Olympic Maru, and now eighteen months chief on the San Pedro Maru, he has made this port at regular intervals.

Chief Kondo is very proud of his ship and her engine room, where he presides over a fine single screw installation of 2250 brake horsepower, single-acting 2-cycle, air-injection Mitsubishi-built Sulzer diesel engine. This plant uses nine tons of fuel a day, which works out at 0.39 pound per brake horsepower hour for all purposes, including the two generating sets.

Lubricating oil consumption is 40 liters a day for cylinders and 10 liters a day for bearing lubrication on the main engine. Chief Kondo is a consistent user of Associated Oil fuels and lubricants.

Personnel Changes. — Ralph J. Chandler, general manager at Los Angeles for the Matson-Lassco interests, has announced that Joseph B. Banning, Jr., has been appointed general superintendent of the Matson-Lassco Lines in Southern Cali-



S. Kondo, chief engineer of the M. S. K. motorship San Pedro Maru, has earned a reputation for efficiency of the power plant under his supervision.

fornia, under a reorganization of operating personnel. Mr. Banning was district agent at Los Angeles from 1920 until the Matson interests were merged with the Los Angeles Steamship Co., and is considered one of the leading authorities on the coast in matters pertaining to the freight traffic. His headquarters will be at the Matson-Lassco terminals.

Under this arrangement Steve Lindo has been made marine superintendent, George Crofut is purchasing agent, and R. P. Dunbar is auditor.

Back To Sea. — Al Fabel, who has been port engineer for the Los Angeles Steamship Company, recently returned to sea as chief engineer of the coastwise liner Yale. He succeeds Thomas McDonald, who has been made chief engineer of the freighter Corrales.

Conference Head Appointed. — The Pacific Coast-European Conference has appointed George J. Yater to the position of manager. The affairs of the conference have been most carefully taken care of by Executive Secretary E. J. A. Watts, but the volume of business handled by this organization has impressed upon the members the necessity of having a full time manager. The conference is made up of about fourteen lines.

Mr. Yater was for many years Pacific Coast Traffic Manager for

Norton, Lilly & Co., a very responsible position and one which has eminently fitted him for the important work to be carried out under the Pacific Coast European Conference.

Women's Traffic Club Entertains. — An enjoyable social interlude in the business of the Port of San Francisco was staged by the Women's Traffic Club of San Francisco on September 23 to which members of the shipping fraternity were invited. Through the courtesy of the San Francisco office of the I.M.M., the Panama-Pacific liner Virginia was turned over to the Club for the evening and the women entertained their guests with bridge and dancing. Mrs. Beulah Morris, of the Williams Steamship Corporation, was in charge of the affair, and she was ably assisted by Miss Nan Lawrence of the San Francisco Machinery Dealers Association. A little cooperation in the matter of handling bridge tables, etc., was furnished by Will Crockett of the Southern Pacific and some of the other members of the men's local traffic club. This was one of the annual social affairs held by the Women's Traffic Club "aboard ship," and was greatly enjoyed by all who attended.

Joins Panama Mail. — Leo Pender has been appointed to the traffic department of the Grace Lines' Panama Mail Service, under Guy Buck.

Obituary. — General M. H. Sherman, pioneer railway builder of Los Angeles, and president of the Los Angeles Steamship Company since its formation over ten years ago, died at Los Angeles September 9 after an illness of several months. General Sherman was one of the leaders in the stupendous development in Southern California industry and commerce and his passing will leave a decided vacancy in the business life of the community.

It is not quite a year since we announced the retirement from active service of Captain William Lyons, who served for sixty years in the merchant marine and who had been forty-four of them with the American-Hawaiian Steamship Company. Captain Lyons died August 26 at Yarmouth, Nova Scotia, at the age of 73.

Official News of the PROPELLER CLUB of California



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September is an eventful month in the business schedule of affairs of The Propeller Club of California, located at San Francisco. The Junior Chamber of Commerce of San Francisco, has for several consecutive years turned over part of the responsibility of the Harbor Day celebration to the Propeller Club. In addition to that, the club during the past month has had an important list of speakers for the weekly luncheons at the Commercial Club and has some interesting announcements to make concerning future luncheons and social affairs.

Weekly Luncheons

August 30. The Luncheon Committee arranged something special for this day—a trip to the California Nautical School Ship California State. This vessel, with her 120 cadets, recently completed a round-America cruise and member Captain Emile Topp, in charge of the schoolship, arranged for a luncheon meeting of the Club on board the ship at California City, the schoolship's shore base. Transportation was furnished by fast water taxis operated by member Tom Crowley for 236 members and their guests.



Charles L. Wheeler, one of San Francisco's leading shipping executives and an authority on South American commerce and industry, recently honored the club with an account of his observations on a recent visit to the southern republics.

On arrival of the guests at the schoolship, a fine lifeboat race between three crews from the schoolship was staged. After the race a very tasty luncheon was enjoyed. Three of the State Schoolship Commissioners were in attendance, namely, John C. Rohlfs, chairman, and Captain Saunders and Captain Edelman. They, together with Captain Topp, and Chief Engineer Dwyer, were congratulated by the members of the Propeller Club for the efficient and shipshape manner in which the schoolship and base are being operated.

September 6. Topic for luncheon talk was "Behind the Cup." As San Francisco is the entrance port for a large coffee trade, the talk by Carroll Wilson of Hills Bros. was both entertaining and educational. Motion pictures showing the coffee industry in all its phases, from production on the picturesque plantations of the tropics to the consumer, were presented.

September 13. Topic for luncheon talk was "Will our Latin American Trade Come Back." The speaker was the well known fellow member Charles L. Wheeler, vice-president and general manager of the Me-



Here is part of the gathering at California City—operating base

Cormick Steamship Company. Mr. Wheeler is a recognized authority on international affairs, particularly in relation to South America. He recently returned to San Francisco from an extensive tour of the Latin American countries made by rail, water, and air, and was thoroughly conversant with the condi-

— PC —



Captain Emile Topp who holds the important position of active head of the Schoolship California State. Captain Topp and his boys recently played hosts to The Propeller Club of California.

— PC —

tions in the countries upon whom we of the Pacific Coast depend for a large measure of our trade. Mr. Wheeler's talk brought out many phases of our relations with the South American republics which were a revelation to his listeners and his talk should be of great value to many of our members.

September 20. Luncheon topic "Increasing the Efficiency of the U. S. Naval Reserve." Commander Abbott, in charge of the Educational Center for the Naval Reserve at San Francisco, gave us a very in-



John C. Rohlf, chairman of the California State Schoolship Commissioners, who accompanied the club on its recent excursion to California City.

— PC —

teresting talk on a subject in which we, as a maritime organization, are deeply interested, in that a great many of our members are officers in the Naval Reserve.

Harbor Day Races

In our next issue (November) an array of photo scenes of the Merchant Marine and California Nautical School lifeboat races on the occasion of San Francisco's Harbor Day will be published. The scenes were taken aboard the gigantic Haviside derrick barge No. 4, which served as the base of operations off the Marina.

Full measure of commendation goes to the committee of The Propeller Club of California, appointed by President James Cronin, which so successfully conducted the racing events. These capable salt water sports sponsors are: Captain A. T. Hunter, chairman, and H. T. Haviside, Captain J. A.

Rumsey, Vernon Showell, and Captain Stanley Allen.

Golf Tournament

The Annual Fall Golf Tournament will be held this year on October 6 at the California Golf Club. C. M. Le Count is chairman of the Golf Committee. His assistants are Russell T. Pratt, Fred P. Ritchie, Vernon Showell, and Thomas B. Forster.

The tee-off will be after 12 noon and dinner will be served at 6:30. For further particulars phone DOuglas 3740.



J. A. Cronin, president of The Propeller Club, accompanied the pilgrimage of the members to the luncheon meeting aboard the California State.

— PC —

New Members

We welcome to our membership the following men:

O. G. Quarre

C. M. Kennedy

Capt. Frank Johnson of the Steamship Yale.

Malcolm E. Crossman, executive officer, California Schoolship California State.



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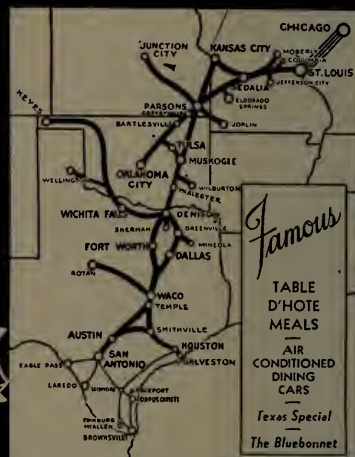
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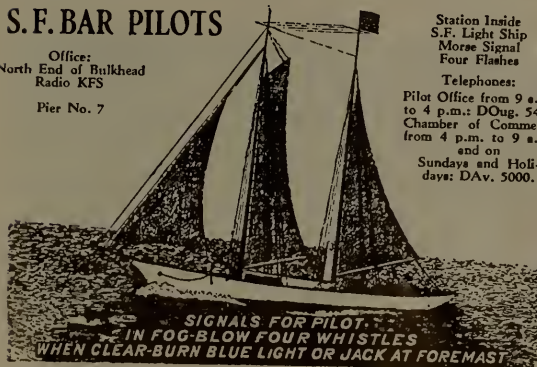
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Book Reviews

THIRTY YEARS IN THE GOLDEN NORTH by Jan Welzl. Translated from the Czech by Paul Selver. 336 pages and map. Bound in blue buckram with gold stampings. Published in the United States by The MacMillan Company. Price \$2.50.

This is a story of adventure in the land where it is daylight for six months and night for six months. It is the story of a young man who was born in Czechoslovakia but who wandered into Siberia and was working on the Transiberian Railway when he determined to go into the far north where, he had heard, a man could establish a place for himself and, working on his own merits, earn an independent livelihood, and thus be free from masters and the uncertainties of labor conditions existing in Europe and Asia. This was not to be an "adventure" in the ordinary sense of the word, but a pilgrimage to find a place to live in independence. His story of his trek across the wastes of Siberia, always facing north, with the object of reaching the islands of New Siberia within the Arctic Circle and of his life for thirty years in this country, with excursions to Alaska and to the West Coast of America, is intensely interesting. One working in the comfortable atmosphere of a San Francisco office building may find it rather hard to believe some of the yarns, especially the one about Welzl knocking the frostbitten hand of his friend against the table to break off the frozen fingers, but we are not adventurous enough to track them down.

There is plenty of interest in the tale and many situations to hold the attention and make one wish for more from this man.

Port Series Report No. 4, Part 2 has just been published by the U. S. War Department, Board of Engineers and Harbors, in cooperation with the United States Shipping Board, and covers the Port of Wilmington, Delaware, and the ports on the Delaware River below Philadelphia. The volume is prepared by the government to supply valuable data for the use of importers, exporters, manufacturers, railroads, steamship lines, and the general public. Obtainable at Government Printing Office, Washington, D.C. Price 25 cents.

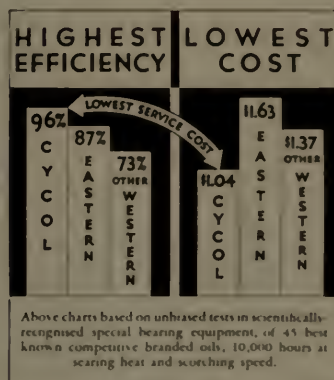


HIGHEST in Wear-Resistance LOWEST in Service Cost!

This chart is based upon the results we have obtained from the government designed "Bearing Test". The same test used by the Navy in buying oil.

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Cylcol is available at 30 marine distributing points along the Pacific Coast.

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Launching of the T. S. S. Washington, sister ship of the Manhattan, August 20, 1932. The largest and highest powered American built ships.

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EVERY new ship that glides majestically down the ways into deep water is a symbol of growing economic power for the nation whose flag she flies. Not by accident have the great seafaring peoples of history dominated the commerce of their worlds. Throughout the eras of man-power, sail and steam, the romance of the sea has been definitely linked with the broader romance of business. ♦ ♦ ♦ ♦

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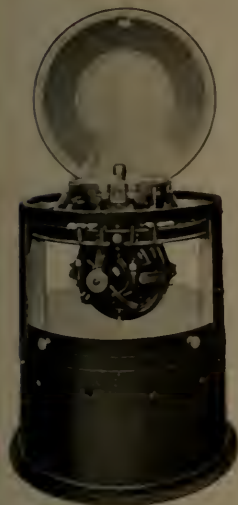
New York Office:
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Pacific Marine Review

NOVEMBER, 1932

*On the Point Ancha
and Point Lobos*

TO SERVE the exacting requirements of their new passenger, mail and express freight service, the Gulf Pacific Mail Line has specified Sperry Equipment



SPERRY EQUIPMENT

Specified for these two modernized liners includes:

The Sperry Gyro-Compass (left view)
The Sperry Gyro-Pilot (right)
3 repeaters and course recorders



The S.S. Point Ancha. This vessel with her companion liner, the S.S. Point Lobos, will operate with Sperry navigating efficiency.



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PACIFIC AMERICAN
STEAMSHIP ASSOCIATION



Official Organ
SHIPOWNERS ASSOCIATION
OF THE PACIFIC COAST

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*Carries the Election
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DURABILITY	X
HARDNESS	X
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Bearing Metal...is a vote for....*

Parsons' White Brass S. A.

Reduce your maintenance costs by specifying the Bearing Metal which has won the highest approval of the Chief and the Supervising Engineer . . . for large bearings where the pressure and velocity factor is high—for lining marine engine bearings, slippers and eccentrics . . . Parsons' White Brass S.A. is the quality bearing metal for steam and motor ship engines because of its absolute reliability.

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Pacific Marine Review

The National Magazine of Shipping

VOLUME XXIX

NOVEMBER, 1932

NUMBER 11

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Steamship Association

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of the Pacific Coast

Alexander J. Dickie,
Editor

Paul Faulkner,
Advertising Manager

Chas. F. A. Mann, Northwest Representative, 1110 Puget Sound Bank Bldg., Tacoma, Washington

S. S. POINT LOBOS...

The S. S. Point Lobos of the Gulf Pacific Mail Lines has a Westinghouse Exhaust Turbine to supplement her reciprocating engines.



Westinghouse Exhaust Turbine raises her speed to 13 knots

THE GULF PACIFIC MAIL LINES have solved the problem of increasing the speed of their recently acquired freighter, the S. S. Point Lobos, by installing a Westinghouse exhaust turbine with reduction gears to supplement the ship's reciprocating engines.

The new turbine with existing boiler equipment delivers 1,075 shp. on normal steam flow. It receives exhaust steam from the engine at 6.7 pounds absolute and exhausts to the condenser. This additional power will be sufficient to raise the vessel's loaded speed from 10.5 to 13 knots.

The equipment designed and built by Westinghouse for this reconditioning job includes: An exhaust turbine, a spring-coupled double reduction

gear, a main thrust bearing, a complete lubricating oil system, a condenser, air ejectors, and the necessary valves and fittings.

Westinghouse marine engineers, backed by experience with this type of marine propelling equipment, are ready to assist you to analyze the performance of your existing reciprocating ships to determine the feasibility of obtaining greater speed and economy.

Westinghouse

Quality workmanship guarantees every Westinghouse product



Pacific Marine Review

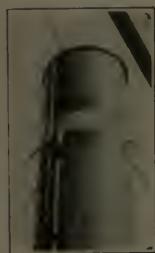
VOLUME XXIX

NOVEMBER, 1932

NUMBER 11

Gulf Pacific Mail Line

A Short Summary of the Development of the Pacific Coast-Caribbean Trade by Swayne & Hoyt, Ltd.



NAUGURATION by The Gulf Pacific Mail Line of a fast direct cargo, passenger, and mail service from Pacific Coast ports to the ports in the Caribbean Sea and Gulf of Mexico, commencing with the sailing of the steamship Point Ancha from the Pacific Coast in October, 1932, marks the latest step in a progressive development which had its beginning under the name of the Pacific-Caribbean Gulf Line in 1918.

In that year, Swayne & Hoyt, Inc., owned two small vessels of about 3000 tons deadweight, and after the government had finished with them for war purposes they were returned to their owners, who endeavored to find some profitable trade in which to enter them.

Swayne & Hoyt had always felt a considerable interest in the potentialities of trade with our nearest neighbors to the south, and, therefore, cargoes were secured for these vessels, sending them into the Caribbean Sea and Gulf of Mexico on a somewhat irregular basis and serving whatever ports of call might be able to develop tonnage. Over a few years this trade gradually established itself and out of the many ports in the territory a few developed a sufficiently regular trade to make service to them available on regular schedule.

At this time, which was about 1923, the company was able to acquire two additional vessels of about 4000 tons deadweight each which were better suited to the needs of the growing trade route. Up to this time the service had been operated under the name of the Pacific Caribbean & Gulf Line, but with the acquisition of the new and better tonnage, it was decided to use the briefer and more descriptive phrase — Gulf Pacific Line.

These vessels served the trade satisfactorily until about 1926, at which time, all of the existing vessels in the route were replaced by a new group of ships of about 5000 deadweight tons and of about one knot additional speed. From this time on, the same type of vessels were used and the fleet increased until in 1930 there were nine of these vessels regularly employed in this service.

In 1931, the United States Government recognized the value of the trade route which had thus been established and granted to the Gulf Pacific Line, a ten year mail contract under the condition that they guarantee to maintain the same regularity of sailings which had

distinguished the service in the past and to provide within a year's time two reconstructed fast modern combination passenger, mail and express steamers, and within an additional one year's time to provide one new vessel.

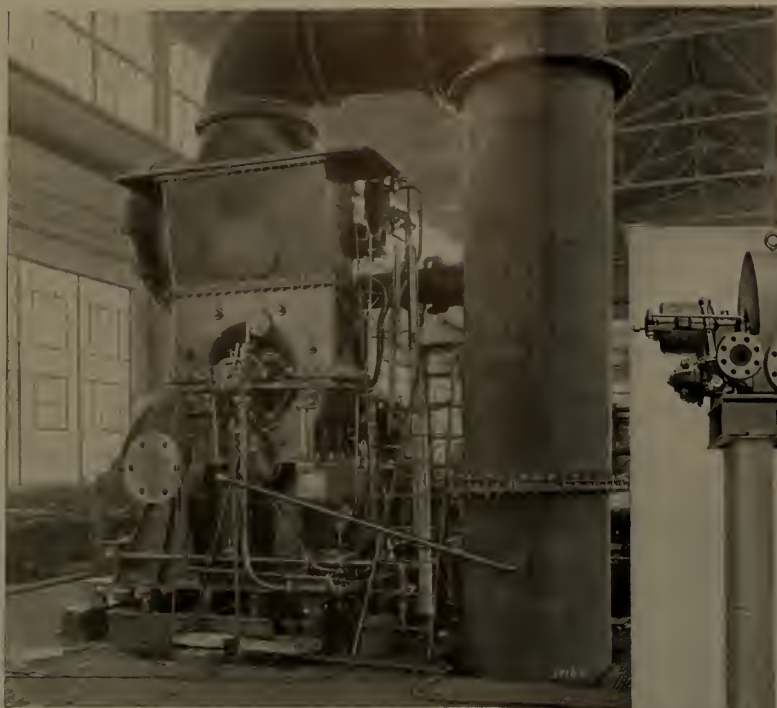
Upon the award of this contract to the Gulf Pacific Line interests, the name of the line was again changed to its present and completely descriptive basis of Gulf Pacific Mail Line.

The vessels provided under these conditions, which have a displacement of 13,000 tons, are the largest, fastest, and best which operate in this trade, and although they are not equipped with the luxuries of the larger passenger liners, we feel they are excellently designed for their work, and all of the capital invested in them has been spent to providing a transportation facility which would be keyed to the exact needs of our shippers and consignees. In comparing these vessels with the original ships of the old Pacific Caribbean Gulf Line, we can hope to make a similar further comparison of what these ships may be to those which will be in service ten or fifteen years from now.

Shippers and consignees, as well as our civic and governmental associates, may be sure that the Gulf Pacific Mail Line will in the future, as in the past, continue to fully provide for all of the needs of the trade, and will always operate the size and type of vessel which will enable us to be just a little in advance of the trade's requirements.



A group of deep-sea traders of the type which gave the Caribbean the sobriquet of "Spanish Main."



At left—Bauer-Wach exhaust turbine, with speed reducing gears, under test at De Laval Works.

Faster Schedule from BAUER-WACH EXHAUST-TURBINE

THE power output of the original triple expansion engines of the 7600 dead weight ton S. S. POINT ANCHA, of the Gulf Pacific Mail Line, Ltd., has been increased 30 percent, without increased fuel consumption, by installing a De Laval Bauer-Wach Exhaust Turbine system of 1075 shaft hp. The circulating water for the condenser is supplied by a De Laval geared turbine driven propeller type circulating pump.

The shocks arising in service from the reciprocating engine and propeller are absorbed in a patented hydraulic coupling, which also provides for automatically disconnecting the turbine and gears when maneuvering.



De Laval vertical shaft propeller type circulating pump, driven by steam turbine through worm reduction gear.



Parts of Vulcan hydraulic coupling with high speed gear.

De Laval Steam Turbine Co., Trenton, N. J.

Manufacturers of Steam Turbines, Centrifugal Pumps, Propeller Pumps, Rotary Displacement Pumps, Centrifugal Blowers and Compressors, Helical Speed Reducing Gears, Worm Reduction Gears, Hydraulic Turbines, Flexible Couplings and Special Centrifugal Machinery.

Sole Licensee of the Bauer-Wach Turbine System

An Interesting Trade Development Tour

*Point Ancha to Carry Specimen Exhibits of Pacific Coast Products for
Display in Ports of the Spanish Main*

IN order to develop goodwill in the Gulf and Caribbean areas of Latin America, Swayne & Hoyt, Ltd., have arranged with numerous Pacific Coast producers and manufacturers a very interesting commercial display tour, sailing from Pacific Coast ports early in November.

On her maiden voyage, the steamship *Point Ancha* will make a commercial good-will or "Trade Development" tour as indicated on the map reproduced herewith. For the purposes of this tour, her No. 2 Tween Deck and No. 3 Bridge deck spaces have been fitted up, decorated, and lighted especially for the display of Pacific Coast products of interest to the Caribbean and Gulf areas.

In these spaces the bulkheads are cream, the ceilings white, and the floors a dark maroon. Number 2 Tween Decks is fitted up for heavy machinery, agricultural implements, and lumber exhibits. Number 3 Bridge Deck space is equipped with tables and cases for the display of canned goods, dried fruits, and a great variety of light manufactured articles.

This tour is to be devoted primarily to building up good will. To that end the Governors of Washington, Oregon, and California have named S. F. B. Morse, one

of the most constructively genial souls on the Pacific Coast, as their special representative to bear the fraternal greetings of the people of these three states to the officials and citizens of the many cities and countries to be visited. The United States Department of Commerce is sending two representatives to study trade possibilities and trade handicaps such as tariffs, credit, and freight rates.

There will be a man along also from each of the following chambers of commerce: Seattle, representing all chambers in Puget Sound area; Portland, representing all chambers in Columbia River area; San Francisco, representing all chambers in Central California; Los Angeles, representing all chambers in Southern California.

Francis McComas, one of the outstanding water-color artists of the world, is going on this cruise for the express purpose of bringing back on many canvases the lure and mystery, as well as some of the commercial activity of the "Spanish Main."

It is the aim of this tour to lay the foundation for mutual trust and esteem in commercial relations between the Pacific Coast and the North Coast of South America, the island empires of the Caribbean, and the East Coast of Mexico.



Diagrammatic chart outlining the route of the trade development tour of the S.S. *Point Ancha* of the Gulf Pacific Mail Line. Above, the S.S. *Point Ancha* on her trials.





The Reconditioned Combination Liner S. S. Point Ancha, photographed
after delivery from the yards of Craig Shipbuilding Company
of Long Beach, California

The Reconditioning of S. S. Point Ancha and S. S. Point Lobos

SWAYNE & HOYT'S Gulf Pacific Mail Line is to be congratulated for the vision and courage which have marked the development of this new trade route and for the energy and common sense with which the reconditioning program has been carried through to completion.

The steamers Point Ancha and Point Lobos have now been reconditioned by the Craig Shipbuilding Company, Long Beach, California. They now have been fitted with modern staterooms and accommodations for eight first class passengers; modern navigation equipment; augmented modern power plants; new shafting and propellers; stream-line rudders and contra-propellers; and have undergone a thorough overhauling and painting so that they are now smart new intermediate cargo liners.

Navigation equipment on both vessels entails the most modern types for efficiency and safety and includes a Sperry master gyro-compass, three repeaters, a Sperry course recorder and gyro-pilot.

The passenger sleeping accommodations consist of four staterooms arranged as shown on the bridge deck plan herewith. These rooms are bulk-headed and coiled in Vehisote paneling finished in soft colorings with American Marine Paint. Each room contains two Simmons beds fitted with the famous Simmons Beautyrest mattresses. This, combined with the fact that each room is an outside room on bridge deck level and is equipped with electric fan, assures sleeping comfort. Each room is equipped with a porcelain wash basin



pipled for fresh cold water and furnished with a full complement of chromium plate trim and toilet accessories. Each room is furnished in mahogany with dressing table, two chairs, and a settee and is fitted with rubber tile floor covering, rugs, and suitable drapes.

Two bathrooms are fitted, each equipped with tub and shower baths and with ceramic tile floor. All plumbing fixtures are Crane.

Finished in Vehisote with mahogany trim, the dining room is furnished in mahogany and the floor is covered with rubber tile in an attractive pattern and an effective color scheme.

The deck over this forward bridge deck house is designed as an open air lounge and smoking space for passengers, as shown in the outboard profile. It is parti-



The passenger accommodations on the Steamship Point Ancha are limited to eight persons. In planning the accommodations, Swayne & Hoyt, Ltd., have achieved a very happy blending of simplicity and comfort. Our illustration shows the dining room, which seats twelve at small tables and is served by a very complete, modern galley equipped with all of the latest marine type culinary devices for insuring delicious meals, tastefully served.

Let Us Bid **YOUR Repairs**



S. S. Point Ancha at Sea

PROMPTNESS
EFFICIENCY
ECONOMY

IN

CONSTRUCTION
RECONDITIONING
ENGINEERING



*Right:- Lifting Westinghouse
Turbine aboard S. S. Point Lobos*

The only Pacific Coast yard to receive
work under the Jones-White act

CRAIG SHIPBUILDING CO.
Long Beach, California

ally enclosed with plate glass hinged windows, making a very comfortable lounging and promenade space. The house exterior and under side of deck are finished in a cool green shade that is very soothing to the eye and will be a gratifying change in the tropics from the usual glaring white.

Plans are completed so that by filling in the bridge deck in way of Hatch No. 3, trunking that hatch and extending the forward house to meet the after house, the accommodation may be expanded to take care of forty passengers.

All of the paint work on the steamship Point Ancha and Point Lobos is being done by the American Marine Paint Company.

On these vessels no attempt is being made to get architectural or interior decorative motifs. Solid comforts are provided in neat trim shipshape interiors of ample dimensions and in pleasing color schemes. This idea will be appealing to the many travellers who prefer the unconventional sociability of the small group to the highly luxurious convention bound existence that is so much featured on our palatial modern liners.

All deck machinery on the two ships was overhauled and put in order and much of the running tackle and standing rigging was renewed. Among materials ordered for these purposes there is an item of 4000 feet of the small diameter sizes of Roebling wire rope installed on each ship. The Tubbs Cordage Company of San Francisco supplied the manila hawsers and ropes for both ships.

In addition to her standing ship's radio set, a new type 100-watt short wave Mackay radio set was installed which gives 10,000 miles clear transmission in the



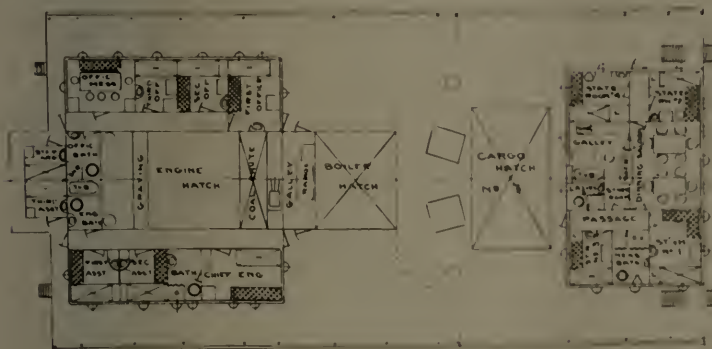
A stateroom on the Point Ancha featuring Simmons berths and Simmons mattresses.

day time and from 12,000 to 15,000 miles at night. This is among the first Pacific Coast installations of this type radio on shipboard. It incorporates the latest improvements in short wave transmission and will keep the ship in clear communication with her home ports throughout her voyage.

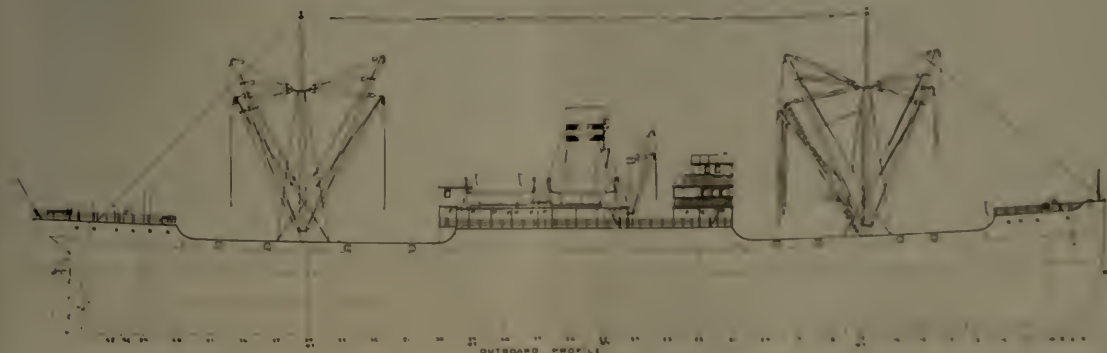
On trials the Point Ancha easily made 14.2 knots over the U. S. Navy measured mile off San Pedro, with only 180 pounds steam. Since her boilers can maintain 210 pounds and the desired and guaranteed sea speed loaded is 13 knots, this trial performance is very satisfactory.

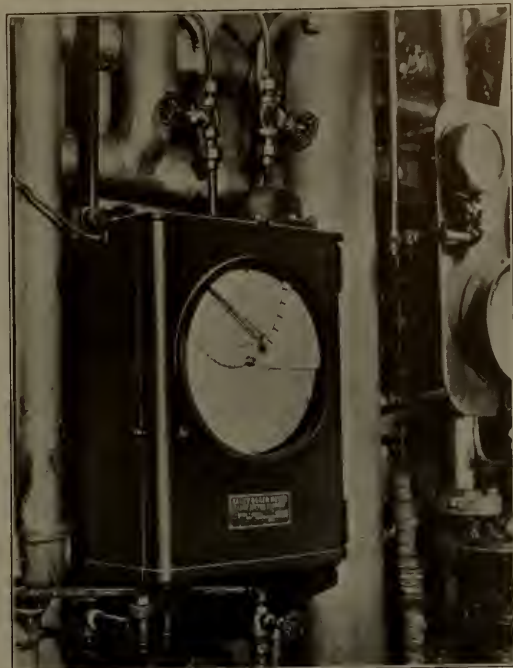
At left, a plan of the passenger accommodations and officers' living quarters on the bridge deck.

Below, outboard profile of the Point Ancha.



BRIDGE DECK





One of three Bailey Boiler Meters installed aboard the "Point Ancha."

Mail Line Insures Combustion Economy with Boiler Meters

The Gulf Pacific Mail Line insures high fuel economy for its ships, "Point Ancha" and "Point Lobos" by the use of Bailey Boiler Meters.

These meters, which combine a combustion guide, a Steam Flow Meter, and a Flue Gas Temperature Recorder all in one enable the operator to regulate fuel and air so as to secure the maximum efficiency consistent with economical boiler operation.

The use of Bailey Meters aboard the Gulf Pacific Mail Line boats is just one of many examples of how ship owners everywhere are securing handsome dividends from Bailey Metering, Control and Regulating Equipment.

{ Write for Bulletin No. 44. It describes the Bailey }
Boiler Meter.

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WIRE ROPES FOR MARINE SERVICE

Where valuable cargo, human life, or costly interruption of work may depend upon unfailing rope service, make certain of safety by using Roebling Wire Rope. Quick shipment of Galvanized Tiller Rope—Hawsers—Mooring Lines—Warps—Running Rope—Rigging and Guy Rope—Mast Arm Rope—Hoisting Ropes—all types and constructions. Complete stocks are carried in San Francisco, Los Angeles, Seattle, Portland, Ore.

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Machinery Installation

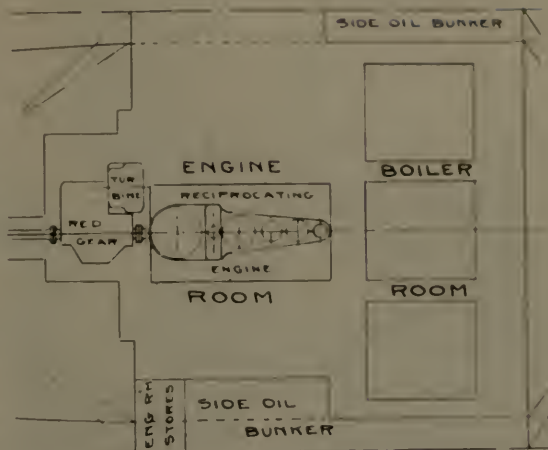
Propulsion Power Augmented by Exhaust Turbines

THE two vessels, just reconditioned by the Craig Shipbuilding Company, Long Beach, California, for Swayne & Hoyt, Ltd., are practically sister ships. The steamship Point Ancha is 379.9 feet long, 53.1 feet beam, 26.9 feet depth; 2991 net tons; 4814 gross tons; and has a single screw, driven by a $24\frac{1}{2}$ x $41\frac{1}{2}$ x 72 inches by 48-inch triple expansion engine taking steam from three Badenhausen marine type water-tube boilers. Steamship Point Lobos is 380.1 feet long, 53.1 feet beam, 27 feet depth and has single screw driven by 24 x 40 x 70 inches by 48 inch triple expansion engine and identical boiler installation.

These power plants have been augmented with the addition of new exhaust turbines and the substitution of new condensers, new pumping equipment, new soot blowers, and new superheaters. With this new arrangement the reciprocating engines will take steam from the boilers at 210 pounds pressure and 70 pounds superheat and will exhaust into the turbines at 6.7 pounds absolute pressure. The turbine exhausts into the condenser at 23 inches vacuum.

In thus raising the power by about 30 per cent it became necessary to enlarge the line and propeller shafts. New 13-inch diameter line shafting and a new $14\frac{1}{2}$ -inch diameter tail shaft with continuous bronze liner were installed in each ship and a new solid manganese bronze propeller 17 feet 3 inches diameter and 16 feet pitch was fitted on each vessel. Shafting was furnished by the Camden Forge Company and the propellers by F. Ferguson and Son, both to American Bureau requirements.

In making the machinery installation, the thrust



Plan showing the machinery space on Point Ancha with the exhaust turbine in place aft of the reciprocating engine.

bearing, beam air pump, engine driven circulating pump, and main condenser were removed from the ship. The new low speed gearing shafts for the turbine installation are made the same length as the old thrust block shaft and so fit into the open spaces left by the removal of the old thrust blocks. Kingsbury thrust bearings are incorporated in the gear casings. The new condensers are installed in approximately the same spaces occupied by the old ones, and the air injectors and their equipment are outboard of the new condensers on the port side, with the new circulating pumps below the condensers. The thrust recess was enlarged, being carried up to the second deck and extended approximately 10 feet on port side to take the new lubricating oil pumps, oil strainer, and oil cooler. The oil sump tanks were set into the double bottom and reserve overhead gravity tanks installed in the upper engine casings. A new $12\frac{1}{2}$ -kilowatt American Blower Western Electric generator was installed on the starboard side of each engine room.

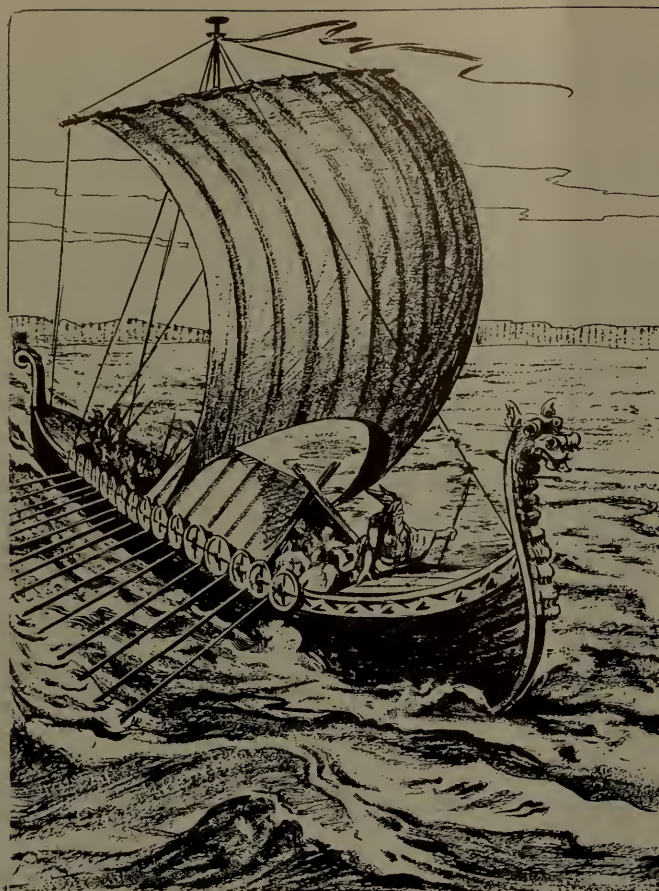
Boiler Reconditioning

The boilers in both vessels were completely overhauled. New Babcock & Wilcox loop type superheaters, designed to give 75 per cent of superheat, were installed between the first and second passes of the tubes in each boiler. Five Diamond soot blowers, so spaced as to thoroughly clean all heating surfaces, were fitted to each boiler. A new main steam line of extra heavy steel pipe, fitted with steel flanges and with extra heavy cast steel nitralloy fitted valves, was installed in each ship.

Three Bailey boiler meters installed on each ship will indicate and record the steam flow from the boiler, record the air flow supplied the furnace for combustion, and record the temperature of the flue gases. The three records will be recorded on one chart, thus



One of the Bailey boiler meters installed on the steamship Point Ancha. This meter records and indicates steam flow from the boiler and records air flow to furnace and temperature of flue gas.



The ships of
the Vikings
had no boiler
cleaning
problems
... neither
have the
modern ships
equipped
with

DIAMOND SOOT BLOWERS

MARINE OFFICES

Diamond Power Specialty Corp.
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Gulf Engineering Service
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524 Poydras St.
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Tate Engineering Co.
508 E. Lombard St.
Baltimore, Md.

Marine Specialty Co.
8 N. Water St., Mobile, Ala.

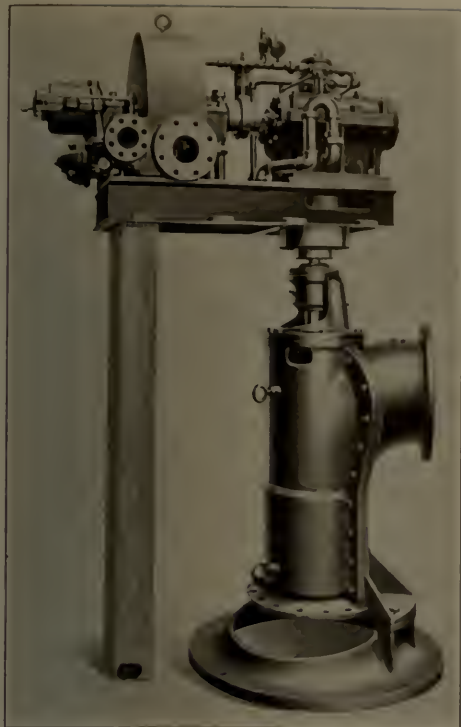
Knowles Iron Works
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58 Main St.
San Francisco, Calif.

Allan Cunningham Co.
124 W. Massachusetts St.
Seattle, Wash.

DIAMOND
POWER SPECIALTY
CORPORATION
DETROIT, MICHIGAN





De Laval steam turbine driven vertical propeller type main circulating pump, as installed on the steamship Point Lobos and the steamship Point Ancha. Capacity is 6000 gallons per minute against a 25-foot head.

making it easy for the fireman to detect faulty operation of the boiler and guard against poor combustion. A Bailey thermo-hydraulic feed water regulator is installed on each boiler. A pump governor is installed on the boiler feed pump to maintain a constant differential pressure between the steam pressure in the main steam header and the feed water pressure on the discharge side of the pump. The generator unit of the thermo-hydraulic feed water regulator is installed on the center line of the boiler drum to lessen the effect of roll and pitch of the vessel. The valve proper is of the fully balanced, tight-seating type with scientifically designed vee ports so that complete control of the flow of water is assured at all rates of steaming and there is no possibility of flooding the boiler when operating at a light load or when banked.

New Condensers

The new main condensers for each ship were furnished by the Westinghouse Electric & Manufacturing Company and each has a cooling surface of 4400 square feet. This condenser will be capable of condensing 40,000 pounds of steam per hour at 28 inches vacuum when supplied with 6000 gallons per minute of 80 degrees Fahrenheit sea water. It is of the 2 pass radial flow type, with steam inlet arranged on top at the after end, and is connected to the change valve and turbine by a welded steel exhaust trunk.

Steam enters an annular space within the shell surrounding the nest of tubes from which it flows radially toward the air take-off header located approximately at the center of the tube nest.

The condenser shell is manufactured from 3 1/2-inch copper bearing steel and is of all welded construction with the usual standard fittings, such as drains, vacuum gauge connections, and a float for controlling steam to condensate pump built into the shell. The water boxes are cast iron and the inlet and discharge nozzles for the circulating water are cast into the after water box. Tubes were furnished by the Sevvill Manufacturing Company, and are straight, seamless aluminum bronze 3 1/2 inch outside diameter 18 B.W.G. with an active length of 10 feet 6 inches. These tubes are expanded at the inlet end into Muntz metal tube sheets and are packed with Crane's metallic packing at the outlet end.

Two Westinghouse air ejectors, each consisting of two stages, are mounted on a common inter- and after-condenser located on a bracket attached to the main condenser. The inter- and after condenser is made of welded steel with 5 8-inch outside diameter 18 B.W.G. aluminum bronze tubes expanded at both ends into composition tube sheets.

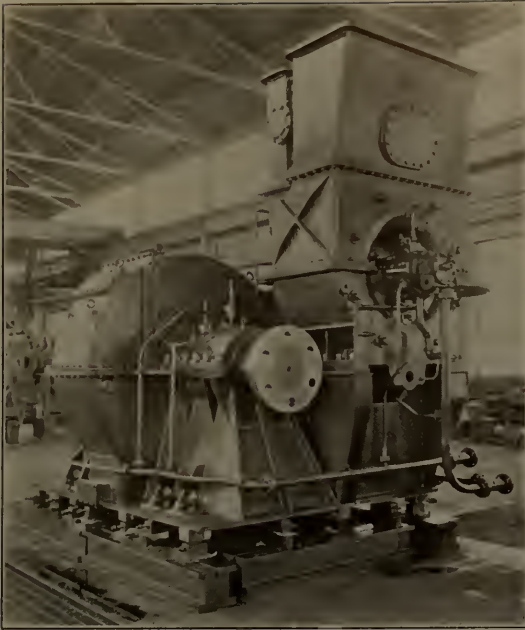
The main circulating pump on each ship was furnished by the De Laval Steam Turbine Co. and is of the vertical propeller type, driven by a horizontal turbine, with a capacity of 6000 gallons per minute against a 25-foot total head. The pump housing is made of cast iron with a bronze impeller on a steel shaft which is fitted with a corrosion resisting steel sleeve and lignum vitae bearing. The pump turbine operates at about 4500 revolutions per minute which is reduced by the gear to the pump speed of about 1200 revolutions per minute.

The condensate pump is 7 1/2 x 6 x 10 inches, of the horizontal duplex piston steam type with water-sealed glands, furnished by The Worthington Company. Steam to this pump is controlled by a float in the bottom of the condenser. The condensate pump takes suction from the bottom of the condenser and discharges through the air ejector condenser to the suction of the feed pumps, with a branch to the hot-well which will act as a surge tank.

The two original feed pumps of the 10 x 7 x 18 inch



Two Westinghouse 2-stage air ejectors mounted on a common inter and after condenser. A unit of this type takes care of the vacuum on each of the two ships.



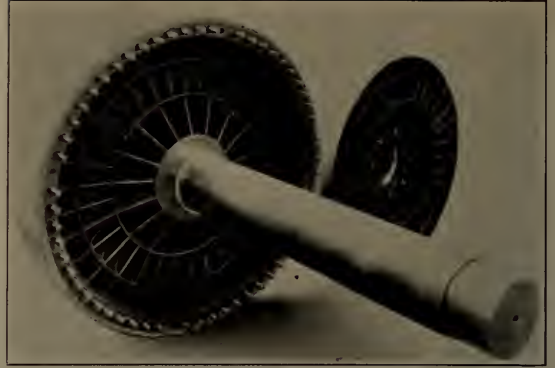
The complete Bauer-Wach-De Laval exhaust turbine and gear unit for the steamship Point Ancha, as set up in the shop of the De Laval Steam Turbine Company.

simplex type discharge the condensate through a new 3-inch Davis feed water filter and grease extractor and a new Davis, size 14-11, improved Paracoil feed water heater to the boilers. The grease extractor has a capacity of 45,000 pounds of water per hour, and the feed water heater is capable of heating 45,000 pounds of water per hour from 100 to 225 degrees Fahrenheit with steam in the shell of the heater at 10 pounds gauge pressure. Steam for heating the feed water is furnished from the exhaust of the engineroom auxiliaries.

Exhaust Turbine Installation Point Ancha

For the Point Ancha, the exhaust turbine was furnished by the American Bauer-Wach Corporation and built by the De Laval Steam Turbine Co. This turbine is of the reaction type and contains six rows of moving and six rows of stationary blading. Blading is made of 4 per cent nickel steel, and the moving blading is fastened to a solid rotor designed to operate at 3350 revolutions per minute. Turbine casing is made of semi-steel and split horizontally with the steam inlet and exhaust branches arranged in the top half of the casing. No dummy is fitted, thrust being taken by a Kingsbury type of thrust bearing fitted on the forward end of the turbine. Turbine glands are fitted with carbon packing with a corrosion resisting steel liner on the shaft in the way of packing. Danger from over-speed is eliminated by an emergency governor, fitted in the forward end of the rotor which operates a change valve and hydraulic coupling mentioned subsequently.

Designed to develop 1075 shaft horsepower when receiving 40,000 pounds of steam per hour from the reciprocating engine at 6.7 pounds absolute pressure and exhausting to the condenser at 28 inches of vacuum, this turbine will add over 30 per cent to the shaft horsepower of the vessel.



A dismantled view of the Vulcan type hydraulic coupling and high speed gear for the Bauer-Wach exhaust turbine of the steamship Point Ancha.

When maneuvering or going astern, steam is directed from the reciprocating engine to the condenser by means of a change valve mounted on top of the turbine inlet and connecting to the exhaust trunk from the turbine to the condenser. This change valve is automatically operated by a piston through an oil relay attached to the reverse shaft of the reciprocating engine, so that when maneuvering or going astern steam is automatically directed into the condenser and the turbine is cut out.

Gearing. The gears are of the double reduction single helical type, and the ratio is such as to reduce the speed of the turbine to the line shaft speed at 95 revolutions per minute. The pinions are cut directly on the pinion shafts which are oil tempered carbon steel. The high speed gear is cut in a band mounted on the hydraulic coupling and the low speed gear is cut in a band shrunk on to a rigid cast iron gear center. Gears and pinions have been carefully tested for static and dynamic balance. The low speed gear shaft also contains a collar for the main Kingsbury thrust which is mounted at the forward end of the gear casing. Gear casing is made of welded steel construction throughout, well ribbed and stiffened to insure sufficient rigidity. Bearings are rigidly fastened in the gear casing



View of the D2 Laval-Bauer-Wach exhaust turbine with upper casings removed showing turbine rotor and gearing.

and fitted with roll out sleeves. An hydraulic coupling of the Vulcan type is fitted on the after end of the intermediate gear shaft to permit of disconnecting the turbine from the line shaft when maneuvering or going astern.

The gear casing is designed to fit on to the tank top with 1 1/4-inch steel chocks and the tank top is specially stiffened with a sole plate and additional stiffening in the inner bottom to take the weight of the gear case. The turbine is mounted on top of the gear case and is connected to the high speed pinion by a long quill shaft.

Lubrication. The lubricating oil system is of the gravity type and consists of an overhead gravity tank, a sump tank, two vertical simplex steam lubricating oil pumps, a duplex strainer, and an oil cooler and connecting piping. The two lubricating oil pumps are 10 x 10 x 12-inch vertical simplex type and were furnished by The Worthington Company. The twin strainer was furnished by the Schutte & Koerting Co., and the oil cooler of the straight tube type, having about 200 square feet of cooling surface, was furnished by the Westinghouse Electric & Manufacturing Co.

The lubricating oil pumps take suction from the sump tank and are controlled by a float in this tank to maintain a constant level of oil in the sump. The pumps discharge through the oil strainer and cooler to the overhead gravity tank. Oil then flows by gravity to the turbine and gear bearings. Oil is also taken from the discharge side of the lubricating oil pump before the strainer to fill the Vulcan coupling, and to operate the change valve. A float operating a steam whistle serves as an alarm for low oil in the overhead tank.

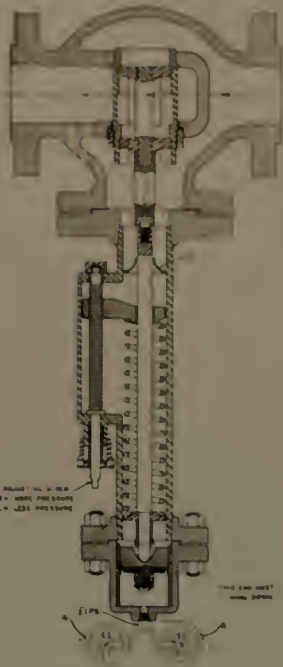
Cooling water for the oil cooler is taken from the main circulating pump discharge prior to main condenser, and will discharge overboard through an independent connection. A Sharples centrifugal type oil purifier with capacity of 75 to 100 gallons per hour is connected in the lubricating oil system.

The overhead gravity tank has a capacity of 125 cubic feet for operating oil and 75 cubic feet for reserve oil. The sump tank has a capacity of about 20 cubic feet. A tell-tale, which is visible from the engine room platform, is fitted to the float in the sump tank. All lubricating oil piping is made of steel, except branches to the turbine gear bearings, which are of copper.

Turbine Installation S.S. Point Lobos

Propelling machinery for the steamship Point Lobos is similar in all respects to the steamship Point Ancha, except that the reciprocating engine is of slightly smaller bore and that the exhaust turbine and gear were designed and furnished by the Westinghouse Electric & Mfg. Co. This turbine is of the reaction type, and is fitted with four rows of moving and four rows of stationary blading made of corrosion resisting steel. The connection to the line shaft is through double reduction, double helical gears and a spring loaded coupling. The low speed gear wheel is mounted on the gear shaft by a large bronze bushing which permits the gear wheel to rotate on the shaft. The shaft is fitted with two spiders, one on each side of the gear wheel and each one having six radial arms corresponding with an equal number of lugs on the gear wheel. Springs are inserted between the spider arms and lugs to transmit the power from the gear wheel to the shaft by compression of the springs.

The turbine is fitted with a single row of impulse



A vertical elevation of the valve of the Bailey thermo-hydraulic feed water regulator. A unit of this type is installed on each boiler of the steamship Point Ancha and the steamship Point Lobos.

astern blading on the forward end of the rotor. Ordinarily operating on low pressure steam from the reciprocating engine exhaust, the turbine, when maneuvering ahead, will take high pressure steam through an expanding pipe to reduce the pressure before entering the reaction blading. For maneuvering astern, the astern turbine will operate on high pressure steam only. Oil operated maneuvering valves controlled by relay attached to the reciprocating engine reverse shaft will admit steam to the ahead and astern blading when maneuvering, the operation being entirely automatic.

Control is by oil governor, operating an over speed valve inserted in the main steam pipe to the reciprocating engine. Turbine is steam sealed up to half speed, and water sealed above half speed, change between steam and water being automatically controlled by an oil operated valve. A flexible coupling is provided between the turbine and the high speed pinion.

The change valve for directing the steam to the turbine and the condenser from the reciprocating engine is located at the exhaust nozzle of the reciprocating engine and is connected to the turbine with a welded steel pipe and to the exhaust trunk to the condenser with a copper pipe to insure flexibility. The valve is controlled by the relay attached to the reciprocating engine reverse shaft.

The lubricating oil system is of the ejector type. An oil impeller on the turbine shaft will supply oil as the motive fluid to an ejector located in the sump tank which will discharge through the duplex strainer and oil cooler to the turbine and gear bearings, and also to the suction of the oil impeller.

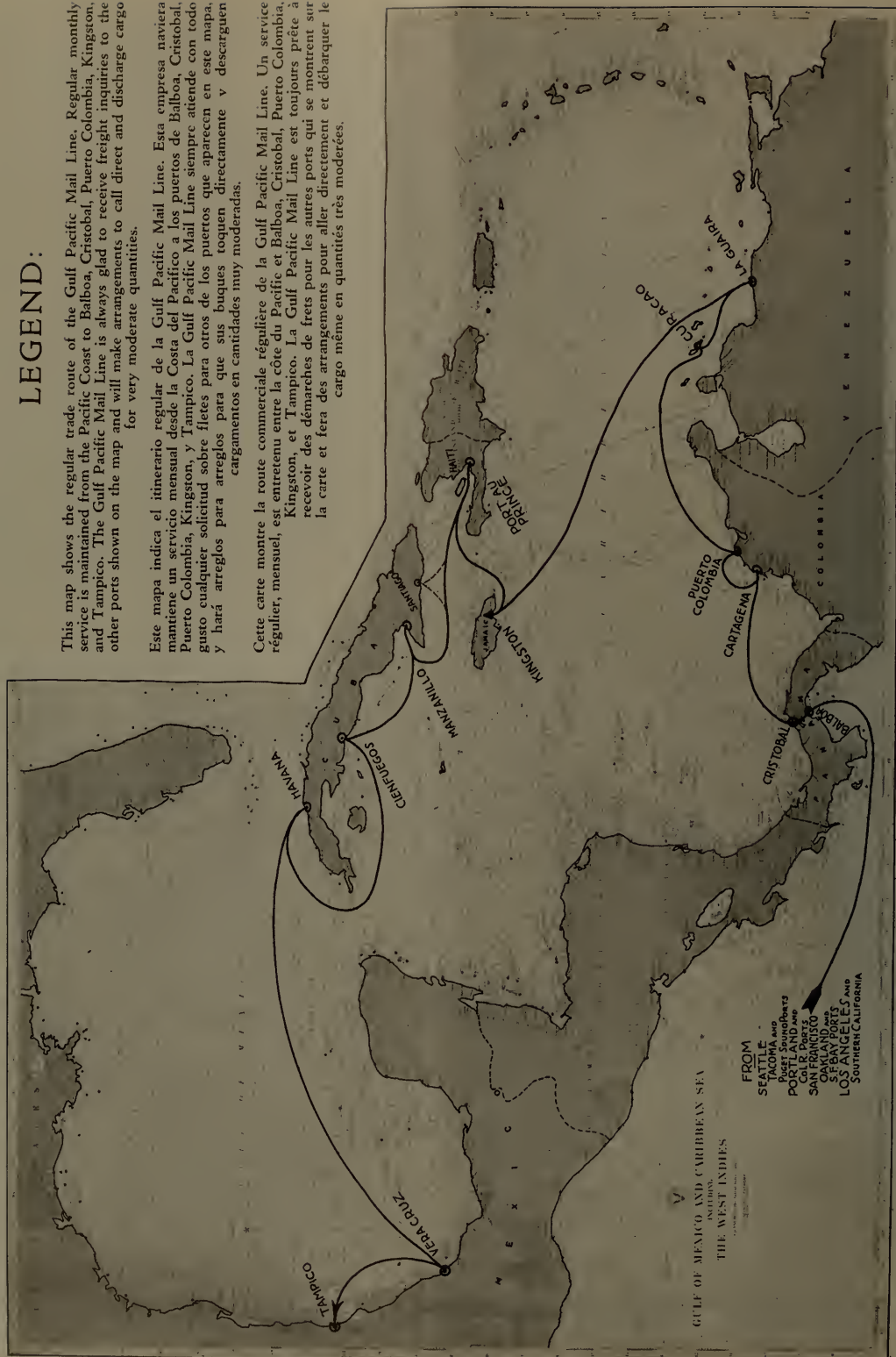
For starting, two turbine driven oil pumps are provided. The turbines on these pumps are arranged to automatically cut in if the pressure in the system falls below a predetermined value. A 500 gallon reserve oil tank is installed in the upper engine casing.

LEGEND:

This map shows the regular trade route of the Gulf Pacific Mail Line. Regular monthly service is maintained from the Pacific Coast to Balboa, Cristobal, Puerto Colombia, Kingston, and Tampico. The Gulf Pacific Mail Line is always glad to receive freight inquiries to the other ports shown on the map and will make arrangements to call direct and discharge cargo for very moderate quantities.

Este mapa indica el itinerario regular de la Gulf Pacific Mail Line. Esta empresa naviera mantiene un servicio mensual desde la Costa del Pacifico a los puertos de Balboa, Cristobal, Puerto Colombia, Kingston, y Tampico. La Gulf Pacific Mail Line siempre atiende con todo gusto cualquier solicitud sobre fletes para otros de los puertos que aparecen en este mapa, y hara arreglos para arreglos para que sus buques toquen directamente y descarguen cargamentos en cantidades muy moderadas.

Cette carte montre la route commerciale régulière de la Gulf Pacific Mail Line. Un service régulier, mensuel, est entretenu entre la côte du Pacific et Balboa, Cristobal, Puerto Colombia, Kingston, et Tampico. La Gulf Pacific Mail Line est toujours prête à recevoir des déclarations de frets pour les autres ports qui se montrent sur la carte et fera des arrangements pour aller directement et débarquer le cargo même en quantités très modérées.



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Extra Superior Manila Rope, long the standard of the Pacific Coast was the choice of the Craig Shipbuilding Corporation and Swayne and Hoyt for the "Point ANCHA" and "Point LOBOS". Owners of many vessels realize that Extra Superior Manila, rot resistant and water repellent, internally treated for permanence, is the standard of comparison. As a word of caution don't buy rope "as good as TUBBS"—buy the best—EXTRA SUPERIOR MANILA.

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Marine Exhaust Turbine

Rehabilitation of S. S. Point Lobos

Westinghouse Develops an Interesting System for Applying Exhaust Turbines to Reciprocating Engines

THE modernization of the steamships Point Lobos and the Point Ancha by the Gulf Pacific Mail Line of San Francisco is noteworthy in that it demonstrates what can be done with an average cargo vessel to make her meet the requirements of a certain present day trade as to speed and facilities for carrying passengers and cargo. The work was ably planned and executed by the officials of the company so as to give excellent results for a comparatively small investment. Too much commendation for their progressive ideas can not be given to the officials of Swayne & Hoyt, Ltd., managing owners, for what they are doing to help place the American merchant marine in its rightful place on the trade routes of the world.

The development of marine power and engineering grew up around the reciprocating steam engine and it must be admitted that the reciprocating engine has served well. Nevertheless, with the demand for higher speeds, reduced machinery weight and space, and increased economy of operation, the reciprocating engine is rapidly being displaced by the steam turbine as a means of ship propulsion, and practically all new steam ships are driven by turbines. However, there are still many old ships propelled by reciprocating engines that have many years of service left in them, but these old ships are finding it more and more difficult to compete with the modern turbine-driven ships, and it is evident that if something is done either to increase their speed or efficiency or both a great step forward will have been made toward maintaining the efficiency of the American merchant marine.

Changes in hull, new propellers and rudders, minor changes in the machinery, etc., will produce some improvement, but only major changes such as modernizing with geared turbines or supplementing the reciprocating engines with exhaust turbines will produce results which will keep these old ships in active competition with the modern vessels.

Though considerable use of the exhaust turbine has been made abroad to improve the operation of old ships, very little use has been made of it in this country, there being at present only four installations; two on ships owned by the Luckenbach Steamship Company and the two recent installations on ships of the Gulf Pacific Mail Lines. The exhaust turbine unit on the steamer Lena Luckenbach was built by a foreign concern while the unit for the Susan V. Luckenbach was designed and built by the Westinghouse Electric & Mfg. Company. The exhaust geared turbine unit for steamship Point Lobos of the Gulf Pacific Mail Lines was also designed and built by Westinghouse.

Although the Westinghouse company built, way back in 1908, the first marine geared turbine unit and has built turbines and gears for several hundred ships, the installation on the Susan Luckenbach was the first exhaust geared turbine unit that Westinghouse built for marine service. On the other hand, the company has

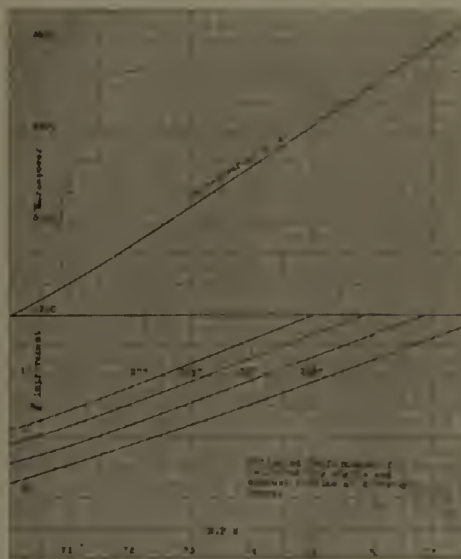


Fig. 1. Upper curve shows improvement in indicated horsepower. Lower curves show percentage of improvement for different vacua by the use of exhaust turbines.

built a large number of exhaust turbines to operate in conjunction with reciprocating engines for power plants and the improved economy obtained has amply justified the cost of these installations.

The exhaust geared turbine unit as built by the Westinghouse Company consists of a straight reaction turbine designed to take the exhaust steam from the reciprocating engine and is connected to the propeller line shaft through reduction gears. As the engine can utilize only a vacuum of about 24 inches, it is obvious that the addition of a turbine capable of utilizing vacuum up to the maximum attainable in a modern condenser will increase the power output or, if no more power is desired, the economy. In order to get the maximum improvement it is necessary to increase the back pressure of the engine to a certain extent, usually about 16-18 inches of vacuum.

Figure 1 shows a typical performance curve for a 2700 indicated horsepower, 69 revolutions per minute reciprocating engine, supplemented by an exhaust turbine. The improvement, or percentage of reduction in steam required, obtained by the exhaust turbine is given for different vacua. The point on the indicated horsepower curve indicated by zero improvement for the various vacua gives the combined indicated horsepower attainable on the steam flow originally required by the engine at its original rating. For purposes of comparison, the combined power of the reciprocating engine and exhaust turbine is given in indicated horse-



Exhaust end of the Westinghouse marine type exhaust turbine for application to reciprocating engine.

power and for actual shaft horsepower, $0.9 \times \text{I.H.P.}$ equals S.H.P. These curves also indicate the necessity of condensing equipment that will maintain a higher vacuum under operating conditions.

Turbine

The turbine, as stated, consists of a straight reaction turbine made up of four pairs of rows of stainless steel blading. The spindle in which the rotating blades are securely fastened in T-root grooves is of the Westinghouse solid rotor type. The main features of the solid rotor are that the construction is simplified by the rotor being one forging, that any disturbance of the blading position has little effect on the balance, and that all noticeable vibrations are eliminated in the normal operating speed range of the turbine. The rotor also has a single row of impulse blades for astern operation. The inclusion of this astern element provides for operating the vessel on the turbine alone in an emergency as well as cushioning the rotating parts when maneuvering, thus giving longer life to the apparatus.

The turbine glands are of the steam and water seal type. These glands seal with water at speeds above one-half normal, and at speeds below one-half normal steam seal is used. The change from water to steam seal and vice versa is made by an automatic geared control valve.

The turbine has an oil operation overspeed governor. Being oil-operated it is free from the defects often found in mechanical governors in that it is positive in operation and will not stick. This governor actuates a butterfly valve in the main steam line leading to the reciprocating engine and high pressure maneuvering valves.

The turbine for the steamship Point Lobos is guaranteed to deliver 1075 shaft horsepower at 95 revolutions per minute of the propeller (the gears have a reduction ratio of 3600/95 revolutions per minute) when supplied with 40,000 pounds of steam per hour having not more than 8 per cent moisture at 6.7 pounds absolute pressure and exhausting at 28 inches vacuum (30 inches barometer). On test in the South Philadelphia Plant of the Westinghouse Company these guarantees were bettered by an appreciable margin. Figure 2 is a shop view of this turbine.

Reduction Gears and Propeller Thrust Bearing

The gearing for the Westinghouse exhaust turbine which connects the turbine to the propeller shaft consists of a double reduction, double helical gear, contained in a welded steel case.

Easy dismantling of the gear is provided by means of vertical joints in the housing of the low speed gear. These joints allow the gear to be rolled out when dismantling instead of having to be lifted out vertically.

The turbine is coupled to the gearing at all times through a flexible coupling. The connecting shaft is of the grill type and is secured to the far end of the hollow high speed pinion. This allows a maximum of flexibility in a minimum of space.

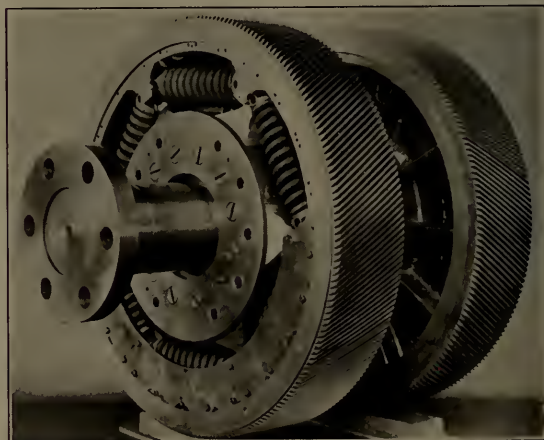
In order to prevent the torque variations of the reciprocating engine from producing deleterious effects on the gear transmission, a special spring coupling is built in the low speed gear wheel. One of these built-in gear wheel spring couplings is shown in Figure 3. The size of the springs is accurately determined by taking into account all the moving parts of the engine as well as the propeller and shaft, with the result that the engine torque variations are not transmitted to the gears and the gears run smoothly without bumping or wear on the astern faces of the gear teeth.

The propeller thrust bearing, of the Kingsbury type, is built integral with and forward of the gear case. This bearing absorbs the total propeller thrust and takes the place of the traditional horseshoe thrust bearing. It is interesting to note that the combined length of the Kingsbury thrust bearing, the spring coupling, and low speed gear with its supporting bearings is only slightly greater than the length of the horseshoe thrust bearing. This means that the gearing for the exhaust turbine, except in extreme cases, can be fitted in the existing thrust bearing recesses without making appreciable changes in the recess structure.

Maneuvering and Lubricating Systems

For directing the exhaust steam from the engine to the turbine while under way and by-passing it to the condenser when maneuvering, a special oil-operated 3-way valve is installed in the engine exhaust line. This valve is controlled from the maneuvering platform. When maneuvering, the turbine operates in either direction on high pressure steam. The valves which control this high pressure steam are oil-operated through relays which are connected to the engine linkage lever.

The lubricating oil for the turbine and gears is initiated by an impeller pump mounted on an extension of the turbine spindle. This pump supplies high pressure oil to the various oil-operated valves, such as the



The slow speed gears of the Westinghouse exhaust turbine installation on the steamship Point Lobos showing the method of transmitting through compressed springs and spider.

change over valve, maneuvering valves, the overspeed governor, and gland control valve, as well as supplying motive oil for the lubricating oil ejector. This ejector supplies lubricating oil in large quantities to all bearings and gear teeth.

When starting, the lubricating oil is supplied by two auxiliary turbine driven centrifugal lubricating oil pumps. Each pump acts independently of the other thereby assuring positive oil pressure at all times. When the exhaust turbine approaches operating speed the auxiliary oil pumps are automatically cut out; and conversely if the speed is reduced they will be automatically cut in again. The lubricating oil system for the turbine and gear is made complete by being provided with a lubricating oil cooler of sufficient capacity and a duplex lubricating oil strainer.

The Condensing Equipment

In order to obtain the high vacuum required for operating a steam turbine at high efficiency, it is necessary to either install a new condenser in place of the original one or to provide the existing condenser with some means of producing higher vacuum. It has been found in the majority of instances, however, that new condensers are far more satisfactory than attempting to revamp the old condensers for the new capacity. For the four American Merchant Ships which have been equipped with exhaust turbines, Westinghouse has supplied new condensers for three of them and built equipment to supplement the existing condenser on the fourth ship.

The condensers for the steamship Point Lobos and steamship Point Ancha represent the latest development in marine condenser construction in that radial flow design has been used and the shells are of welded steel construction. The radial flow design permits maximum vacuum with a minimum pressure drop and condensate temperature depression. The condensers have 4400 square feet of cooling surface and have two passes. When 6000 gallons per minute of 80 degrees Fahrenheit cooling water is circulated, these condensers will maintain a vacuum of 28 inches (referred to a 30 inch barometer) when condensing 40,000 pounds of steam per hour.

Each condenser has air ejectors of the Westinghouse type consisting of two sets of 2-stage air ejectors mounted on a common intermediate and after condenser.

An Interesting Conversion to Oil Fuel

FOR many years the peculiar two-stack profile of the coal-burning United States Army tug Slocum has been a familiar sight on San Francisco Bay. Thirty-four years old, she had won the right to wear on her stacks two chevrons for world war service. Recently, her hull being still in very good condition, the Army Quartermaster Corps determined to completely recondition this tug and convert her to an oil-burner. This work has now been completed at the Oakland yard of The Moore Dry Dock Co.

Practically all the old structural members in way of the former coal bunkers and coal hatches were removed and new welded oil-tight steel bunker tanks were installed with the necessary manholes, ladders, steam-heating coils, brass bleeder plugs, Pneumometer gauges, sounding pipes, vent pipes, and other appro-

ed fittings, all according to the rules and regulations both of the American Bureau of Shipping and of the United States Steamboat Inspection Service.

There are two cylindrical fire-tube boilers on the Slocum, each fitted with three furnaces. Six Ray rotary oil burners with suitable furnace fronts were fitted to these furnaces. Steel plate extensions were welded to the furnace fronts to take these burners. Two Worthington horizontal duplex reciprocating steam pumps take care of fuel oil service. Boiler firing is automatically controlled by the steam drum pressure, the apparatus for this purpose controlling delivery of oil fuel, supply of steam to burner turbines, and supply of air to furnace. It guarantees that steam pressure will not fall more than four pounds below normal working condition and that safety valve will not lift at any point from full load to no load on engines.

All fuel oil filling, transfer, and suction lines are of galvanized steel and are tested to 200 pounds hydrostatic pressure, and all fuel oil delivery lines are of steel tubing with malleable iron fittings and are tested to 600 pounds hydrostatic.

A Warren vertical simplex steam reciprocating pump takes care of oil transfer and a Worthington fuel oil meter measures the consumption.

In addition to the change of burning installation, the contract specification called for dry docking, renewing six shell plates, painting, overhauling of rudder, gudgeons and stern tube, renewing zinc plates, opening up all sea valves, renewing all standing rigging to foremast, recanvassing portion of boat deck, cleaning out three fresh water tanks, repairing towing bitts forward and aft, renewing portion of lower fender guard, overhauling engine room skylight and all airports, furnishing new rudder quadrant chains, realigning steering gear leads, renewing boat covers, and fitting lead bends to boat deck scuppers.

In the machinery space the following work was executed: retubing and fitting new tube sheet to main condenser, reboring of high pressure valve and installing two new rings; reboring of high pressure cylinder and installing new solid cast iron piston; installing of two new snap rings in intermediate pressure cylinder; reboring bushings on connecting rods of reversing engine; complete overhaul of dynamo engine; overhauling all boiler valves, burned stay bolts and nuts; renewing fire room floor plates and installing new gratings.

The galley space was thoroughly overhauled and a heavy duty Wedgewood gas range was installed in place of the coal burning range. Gas for this range is furnished from a complete installation of "Standard Flamo" system of liquid petroleum gas, consisting of four cylinders enclosed in a gas-tight compartment located on the main deck level in the fidley and piped to the range. This installation is fitted with a pressure regulator to assure suitable pressure at range burners at any usable condition in cylinders; a pressure gauge; a diaphragm relief valve connected to atmosphere; and suitable pipe and fittings between cylinders and regulator. Connection from pressure regulator to range is through copper tubing fitted with "Parker tube couplings." This is a very neat installation and we are assured by the Philippine chef that it works to "very great satisfaction everybody."

In short, the Slocum is now a practically new tug. Her master and crew are well satisfied with her performance and the quartermaster corps is well pleased with the reduction in fuel bills and the neat ship-like appearance of hull and fittings.

Editorial Comment » » »

Build Destroyers on Pacific Coast

PROMPTED by a very laudable desire to relieve unemployment, the Secretary of the Navy has ordered the construction of three destroyers, one each at the Boston, New York, and Philadelphia navy yards. These destroyers were authorized by an Act of 1916 and there are three other destroyers authorized by this act the contracts for whose construction are still unawarded.

To be consistent in its policy to relieve unemployment the Navy Department should proceed immediately with the construction of the three remaining destroyers in private shipyards, preferably on the Pacific Coast.

The construction of three destroyers over a period of twenty-seven months would provide work in private shipyards and plants of allied marine industries for about four hundred men at the end of three months, reaching a maximum of 3500 men in twenty-one months and continuing at approximately this number until delivery of the vessels.

The private shipbuilding industry, particularly on the Pacific Coast, is facing a serious depression. All of the shipbuilding ways of the yards that turned out so many fine destroyers in the war period twelve years back are now empty. No contracts for the construction of merchant vessels are in sight, and serious unemployment and disorganization of working forces in the private shipbuilding yards are already under way.

There are at least four, perhaps six, private shipyards on the Pacific Coast, each of which is adequately equipped and manned to undertake the building of this class of naval vessel. These yards are a national asset, particularly with the present cloudy condition of the political horizon in the Orient and they should be conserved by all possible and proper government assistance. The award of these three additional destroyers to western shipyards would be of almost incalculable benefit by restoring confidence in the future to the steel shipbuilding industry of the Pacific Coast.

A vote for Hoover is a vote for American shipping.

Watch for the Leonids

THE U. S. Hydrographic Office is cooperating with astronomers who are making a study of meteors and kindred phenomena, and in conformity with this purpose directs the attention of mariners to the following article furnished by Professor C. P. Olivier of the Flower Observatory, University of Pennsylvania:

"Since the year 902 A. D., usually at intervals of about

33 years, great showers of meteors have appeared. These are known as Leonids for they radiate from a point in Leo. Their maximum at this epoch will probably be in November, 1932, or 1933, with the best chance for 1932. As a good shower was seen in 1930 and a finer one in 1931, a very much better one is expected in 1932. All persons interested in astronomy are therefore urged to observe during the nights of maximum. These are expected to be November 14-15, 15-16, 16-17, and 17-18; the two middle dates being most probable.

"Counts of all meteors seen per half hour, using G. C. T., from as many ships as possible, are desired for any one of these nights on which large numbers of meteors appear. Also accurate observations of the paths of brilliant fireballs and particularly of long-enduring trains, the latter at minute intervals to determine the drift, should be made. When the position of the ship is exactly given, duplicate observations of such objects from two ships will permit the calculation of their heights and paths, and those of train-drifts will give most important information about the upper atmosphere, obtainable in no other way. The American Meteor Society will undertake the reduction of all such data."

Mariners desiring to assist in the collection of data concerning the approaching display of Leonids are requested to report their observations of this phenomenon to the Hydrographic Office.

*A vote for Proposition 14 is a vote for
California Shipping.*

Statistical Comfort for the Shipbuilder

RECENTLY issued statistics indicate that the United States lags behind at least six maritime countries in ship construction for the past four and one half years in spite of the impetus given to shipbuilding in this country through the Construction Loan Fund of the United States Shipping Board. At the same time the figures quoted show that in total number and tonnage of merchant ships the United States is outranked only by Great Britain.

The chart herewith has been prepared to show the growth of the total merchant marine tonnage of the United States from the year 1790 up to the present time. The tonnage figures thus shown are taken from the published reports of the U. S. Bureau of Navigation and as such include all documented vessels without regard to size or trade. Through this curve has been drawn a smooth parabolic line to indicate the trend in growth by discounting the peaks of the clipper days and the period of the recent war construction program, so that the curve thus shown is at least indicative of and coincident with the values giving the rate of growth and amount of tonnage between 1890 and 1915 when the American Merchant Marine was at its lowest value with respect to world tonnage.

Superimposed upon these curves are shown the va-

lues for the total American tonnage and that part of it confined to the Great Lakes for all vessels of 100 gross tons or over between 1898 and the present time. In this connection it should be noted that the present value of total tonnage on this curve coincides with that of the curve showing the trend in growth. This value of approximately thirteen and one half million gross tons is therefore presumed to be the present day tonnage requirements to maintain the position of the American Merchant Marine under normal conditions.

Compared with available world tonnage figures it should again be noted that the low period for the American Merchant Marine occurred during the early part of the present century from 1900 to 1910 when the United States had about 18 per cent of the total world tonnage. This proportion had fallen from approximately 50 per cent and 33 per cent at the close of the clipper era to a low of 18 per cent and rose again to 30 per cent in the peak year of 1922. It is important, however, to note that the trend curve has been drawn to coincide with this low 18 per cent region of the total tonnage curve so that it is therefore assumed that the extrapolation of the trend curve gives a fairly conservative idea of the tonnage requirements.

Under such circumstances the trend curve would indicate that by 1945 the merchant marine of the United States should comprise a total tonnage of twenty million gross tons which, if world tonnage growth, which has been increasing at the rate of about fifteen million tons per decade, holds fairly constant, will mean that the American fleet will be about 22 per cent of the total world figures.

If this figure of twenty million gross tons by 1945, which appears conservative enough, is to be the re-

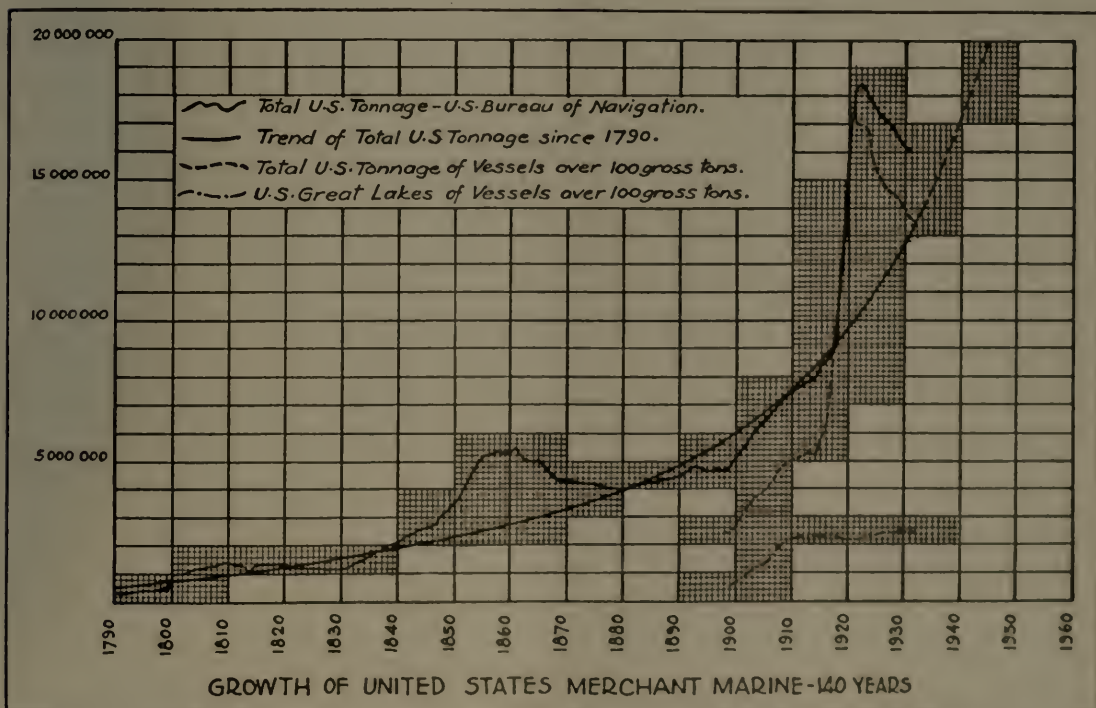
quirement for American tonnage it means that American shipbuilding will at least require to double the rate of construction in the next twelve years without any consideration being given to the normal necessity for replacing existing obsolete tonnage.

[Bulletin American Bureau of Shipping]

Errata

We are filled with chagrin over the unpardonable faux pas we made in the September issue by sending the "largest Commercial Vessel yet built in an American shipyard" out on her maiden voyage without a steering gear and we wish to take this opportunity to reassure our readers on this point. The huge rudder and rudder stock of the T.S.S. Manhattan are adequately under control at all times through a very powerful American Engineering Company electro-hydraulic steering mechanism operated by two 90-horsepower Westinghouse motors, driving Hele Shaw type hydraulic pumps. This is the largest and most powerful commercial gear of this type yet built in America. Complete illustrated description will be found on another page in this issue.

An error in the October issue likewise calls for correction. That "Big-Little Motorship" the oceanographic cruiser Catalyst was built, not in the Lake Washington Shipyards, Seattle, as stated, but in the Lake Union Drydock Company yards, Seattle. The right ship, the right town, but the wrong lake.



An interesting composite curve showing the growth of the United States merchant marine for 140 years and forecasting its growth for the next fifteen years.

Pacific Ocean Shipping Conditions

Some Comment on Recent Maritime Trading Conditions Around the Rim of the Pacific

VIEWED from the standpoint purely of the shipping business, there has been, during the past few months, a very definite trend toward betterment in ocean-borne trade in the Pacific basin area. In certain localities there have been very definite setbacks; but the whole picture is brighter. This trend is largely evident at present in the increase in volume of cargoes. Freights are still at a very low figure. However, increase in freights must come through greater volume of cargo, and as this present trend toward normal volume of sea-borne traffic is accompanied by an international movement for scrapping a large part of the world's laid up tonnage, it holds great hope for better times in the shipping business of the world.

The following summary of business, international trade, and shipping in the Pacific Ocean Area is taken from United States Government reports and other authentic sources.

West Coast North America

Alaska. Salmon pack this year was over 5¼ million cases, with one-third of the canneries idle. This is very close to the old record packs for the territory. There has been a decided revival of gold mining. All regular firms are operating full time, and there has been a noticeable increase in the number of prospectors in all districts. New and good gold quartz areas have been located. Exports of gold dust and bullion for August were valued at \$959,359.

British Columbia. During October the Canadian National Steamships increased its Canada-Australia-New Zealand cargo services by putting on two additional cargo vessels and separating the services so as to give independent services, one for Canada-New Zealand and one for Canada-Australia.

During the fiscal year ending March, 1932, Vancouver became Canadian leading port in tonnage of exports; shipping 3,002,279 tons as against 2,570,835 tons for Montreal. The remarkable growth of Vancouver as a wheat port due to increase in wheat crops of Alberta and Western Saskatchewan is chiefly responsible for this achievement.

During August there was a marked increase in exports of boards and planks due to better markets in Great Britain and Australia, 53½ million board feet in August as against 37¼ million board feet in July. The lumber industry is hampered in exports by lack of domestic markets for the commoner grades.

American insurance companies have over 31 million dollars invested in British Columbia and in 1931 collected for life, fire, and automobile policies over 6½ million dollars in premiums.

Mexico. Effective September 1, a presidential decree prohibited the importation of foreign bank bills, and all classes of foreign or Mexican coins, except gold. Bills of Bank of Mexico are to be admitted free, and all classes of coinage exported free. Exporters of mineral or metallurgical products containing gold are required to import and sell at current rates to the Mexican Treasury an equal amount of gold either in refined

gold bars or foreign gold coin.

Absorbent cotton of all kinds is subject to an increased duty, effective September 8.

Domestic business is marked by a steady improvement in collections, and business firms are discharging foreign obligations with fair regularity and promptness.

Central America. El Salvador showed an improvement in September. Customs collections were ahead of 1931 for the first time in many months. Exchange remained constant, freight traffic was heavier, and importers are busy considering much larger volume of commitments. El Salvador is pointing its tariffs on protection of domestic industries. In Guatemala all business is still on a "hand to mouth" basis. Panama shows increased activity for September.

A New Costa Rican regulation reduces export duty on third-class coffees to 5 per cent ad valorem on condition that these coffees are shipped only during third quarter (July-September) and only to non-European markets.

South America West Coast

Colombia. Foreign trade in fiscal year ending July 1, 1932, dropped 20 per cent in value as compared with preceding year, principally due to decline in prices of coffee and bananas and decline in demand for petroleum. Buenaventura, on the Pacific side, is becoming a very important factor in coffee exports, almost equaling Barranquilla for the first six months of 1932 and promising to become chief port of the country.

Ecuador. Exchange difficulties and political uncertainties are hampering commercial recovery. Volume of cocoa deliveries at Guayaquil is ahead of 1931, but coffee shipments are over 20 per cent less in value. Collections are very difficult. During July a large shipment of Argentine wheat flour arrived in Guayaquil for distribution as the beginning of an attempt to compete with North American flour, which has hitherto practically controlled this market.

Peru. Peruvian sol at present exchange rate equals \$0.205. During the first six months of this year exports were valued at 67,019,522 sols and imports at 36,708,260 sols, declines of approximately 35 per cent and 28 per cent from corresponding figures for 1931. In Peruvian imports, United States declined 45 per cent and Germany 20.1 per cent, while Great Britain increased 6 per cent. In Peruvian exports, United States declined 57.6 per cent and Germany 59 per cent, while Great Britain increased 4.3 per cent.

Peru is apparently going to impose a compulsory pilotage law at all ports.

Chile. Effective September 1, the exportation of wheat and wheat flour has been prohibited by the Chilean government. This is a move to control prices of foodstuffs. Copper output is about 20 per cent of normal, some independent nitrate plants are starting production. Income tax rates have been upped sharply, and the 6 per cent additional tax assessed on incomes of foreign firms is now extended to individuals. Chil-

ean shipping is heavily affected by the depression. In August three of the largest and most modern ships in her merchant marine were turned back to their British builders in payment of balance due on them. Volume of Chile's coastwise traffic this year is less than half what it was in 1930. In order to alleviate distress among unemployed seamen at Valparaiso, Chilean ship operators and seamen's associations have agreed to rotation of entire crews of vessels at end of each voyage.

Australasia

New Zealand. Outlook for the farming community, especially the dairy industry, appeared better as of September 1 than for the past eighteen months. Decided upward trend in prices and prospect of very good yields are bolstering confidence of both merchants and consumers.

One interesting feature of New Zealand's effort to stabilize trade is agreement among tire dealers to stop cut-throat price competition and accept a regular scale of trade discounts to be applied uniformly over the dominion. On account of this agreement, the tire business of 1932 although smaller in volume, promises a better net profit than that of 1931.

The exchange situation is still favorable to British trade, but is gradually easing up and with larger purchasing power among the farmers there should be better opportunity for American goods.

When the stevedores working agreement expired on August 18, employers submitted a new agreement reducing wages and evading certain union rules of work. This agreement, which was aimed mainly at the elimination of all payments except for actual working time, was refused by the stevedores.

Australia. The remaining import prohibitions of the 1930 emergency measure have been removed as of September 1, 1932, and a long list of import duties has been reduced. In Melbourne the building permits for the first seven months of 1932 are nearly double those for the same period in 1931. The wool clip for the season ended June 30, 1932, exceeded 3 million bales for the first time in history. Experts estimate exact figures at 3,051,000 bales. Selling price averaged 10 pounds 18 shillings and 5 pence Sterling. It is considered probable that the government of Australia will decide to abandon the bounty on wheat when the present arrangement lapses this fall. Last year's bounty on wheat added over 3 million pounds Sterling to the Australian national debt.

Primage duty on printing paper other than newspaper for use in the production of newspapers and periodicals registered under postal regulations has been reduced from 10 per cent ad valorem to 4 per cent ad valorem, effective August 1, 1932. Principal trade centers of South and Western Australia report definite improvement during the first half of 1932 due to large crop volume, slightly improved prices, increased gold production, and improved public finances. All over the Commonwealth there is a rising feeling of confidence. Imports are steady, slow but sure improvement in trade and finance is noticeable, and exchange is becoming more favorable.

East Indies. While somewhat more optimistic in tone, business in Batavia and the Netherlands East Indies is still on the decline as far as imports are concerned, with collections difficult and bankruptcies comparatively frequent. Rubber, coffee, pepper, and kapoc on export are in good demand but at very low prices.

Philippines. Total exports (52 $\frac{1}{2}$ million dollars) for first six months of 1932 showed a decline of 20 per cent as compared with 1931. Total imports (42 $\frac{1}{2}$ million dollars) for same period showed an increase of over a million dollars, or about 2 $\frac{1}{2}$ per cent. Principal increases in imports include: textiles, both cotton and silks; drugs and dyes; automobiles and accessories; and tobacco products. On the export side, copra declined 60 per cent, coconut oil and abaca 50 per cent each, trade with the United States increased 20 per cent in imports, declined 15 per cent exports; trade with Japan showed decreases of 40 per cent in imports and 28 per cent in exports.

East Coast of Asia

Malaya. Rubber trading uncertain. Tin steady at low price levels. Textile staple stocks very low and imports in this line are looking up with very definite improvement in sight. Second quarter of 1932 showed 32 per cent increase over first quarter in import of leather goods.

French Indo-China. Total rice export first eight months of 1932 was 824,000 metric tons and is 92,000 metric tons more than last year's figure. France and Japan have recently completed a trade agreement by which certain minimum rates or specified reductions in the Indo-China tariffs are exchanged for lowest rates on certain goods and exemption for Indo-China coal and zinc ore in the Japanese tariff. This agreement probably will have a tendency to increase indirect trading through Japan for United States trade with Indo-China.

China. Notwithstanding the terribly "chaotic" conditions in parts of China, she continues to show good progress in trade. Imports of building materials, machinery, and general merchandise are maintaining good levels, particularly in South China. Effective September 25 duties are assessed on all goods entering Manchuria from China proper.

Cigarettes have developed in China to a 75.7 billion consumption in 1931, with a normal increase of 10 per cent a year. Of this amount, 40 per cent are made by Chinese owned factories and 60 per cent by foreign owned factories. During the first six months of this year China imported 102,200,000 feet of soft wood and 32,900,000 feet of hardwood.

Japan. — An interesting feature of the Japanese activities on the mainland of Asia is the resumption of construction on the Kirin-Tunhua Railway, which will provide an East-West line across the heart of Manchuria connecting with Seishin and Yaki, two North Korea ports located on the Japan Sea. These ice-free spacious harbors are now being developed and will provide Japan with a shorter trade route to Manchuria. Ocean distance from Seishin to Tsuruga on the West Coast of Japan is 400 miles shorter than from Kobe to Dairen, and the land haul by the new railway will also be shorter. Seishin has a large harbor area with 20 feet minimum depth and only two feet tidal variation. Beginning April 1, 1933, the Japanese government has granted a subsidy to the North Japan Steamship Company (subsidiary of Osaka Shosen Kaisha) for a line operating between Tsuruga and Seishin.

Tekvo retail price index upped 5 per cent during the last half of August. Cement, iron, steel, and rayon improved both in production and export volume and price. Silk prices continued to rise slowly.

The Japanese Cotton Spinners Association report 700,000 yen increase in profits for first half of 1932 as compared with 1931.

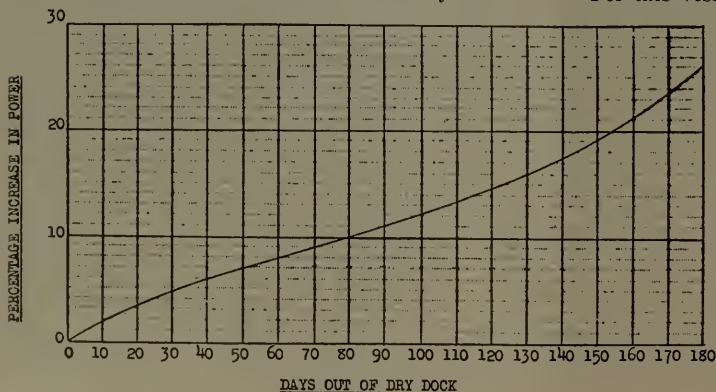
Barnacle Bills Versus Fuel Bills

The Effect of Fouling on a Ship's Bottom Upon the Cost of Propulsion Power

IT is well recognized that the accumulation of barnacles, grass, and other sea growth upon the wetted surface of a vessel necessitates a gradual increase in power with a resultant increase in cost to drive the vessel at a constant speed as the degree of fouling increases. While this condition is well known there is very little specific information as to the actual increase in power required as fouling increased and as to the effect of fouling upon cost of operation.

With a view to throwing some light upon this subject, but with a full appreciation of the fact that its findings are approximate, the National Council of American Shipbuilders has made a study of available information and presents it herewith. A search for information upon which to base its report reveals some data for a few privately owned and operated vessels, some carefully analyzed results of the operation of the battleship Tennessee and the destroyer Putnam of the United States Navy, and an analysis of the operation of eleven Shipping Board vessels. The data on the Shipping Board vessels and privately owned vessels are for numerous services such as from the North Atlantic and Gulf ports to the West Indies, to the West Coast of South America, to the East Coast of South America, to the European ports of France and Great Britain; and from the Pacific Coast to the Orient. The investigation has been limited to periods extending to six months after docking, and the study of each voyage is based upon the time from last docking to the middle of the voyage. In order to eliminate the effect of tides and ocean currents, the study has been confined to the operation of ships in one direction only.

In this study the National Council was confronted with the fact that the data available were based upon operations at different displacements and different speeds. It was, therefore, necessary to make the best practicable corrections to obtain results for operation under a constant speed and at a uniform displacement. In making these adjustments the Council has consulted with those well informed upon the subject and is satisfied that the corrections made are reasonably sound.



The studies made of merchant vessels are for vessels of low speeds. It is realized that the results may be quite different for vessels of higher speeds.

From the information available, for each of the vessels mentioned a curve showing the percentage of increase in power for days out of dry-dock was drawn. These curves showed more or less similar results within a six months period after docking and justified the preparation of a composite curve of horsepower increase through that period. This composite curve is reproduced herewith.

This curve shows that if a vessel is dry-docked every four months it requires 7.8 per cent increase in horsepower over what this operation would be were it possible to have a clean bottom at all times, and that the increase for a five-month period is 9.6 per cent, and for a six-month period is 11.8 per cent. In other words, if a vessel is dry docked at six-month periods only, her average increase in horsepower necessary to maintain a constant speed over that period is four per cent greater than it would be were she dry-docked at intervals of four months.

The actual effect upon cost of operation depends, of course, upon cost of docking, loss of time due to docking, and other factors depending upon the individual shipping service concerned.

As a typical example of a privately operated oil-burning ship over a five-year period for which information is available we have the following figures:

Indicated horsepower after docking, approx. 3,200
Fuel consumption per I.H.P. per hour, lbs. 1.35

Four-Month Dockings

15 Dockings at \$2800 = \$42,000.
Increased fuel cost over clean bottom = \$23,400.

Five-Month Dockings

12 Dockings at \$2800 = \$33,600.
Increased fuel cost over clean bottom = \$29,100

Six-Month Dockings

10 Dockings at \$2800 = \$28,000.
Increased fuel cost over clean bottom = \$35,700.
For this vessel dry-docking at periods slightly over five months would seem to give the most economical operation.

It must be understood, of course, that the actual results for other ships in similar trade routes will depend largely upon their cost of dry docking and their fuel economies.

Information is available for other cargo vessels operated for the account of the Shipping Board than those contained in this report, and it is suggested that this subject is one worthy of further and more exhaustive study. Detail data from which this report is made are on file for reference, if desired, at the office of the National Council of American Shipbuilders.

Double Reduction Gear Compound Turbines for the Seatrains

THE drawing reproduced herewith shows the De Laval compound turbine with double reduction gears as supplied for the Seatrain New York and Seatrain Havana.

Each unit is rated at 8000 horsepower at 105 revolutions per minute and is expected to develop 8800 horsepower at 110 revolutions per minute. It is reported that on the recent trial of the Seatrain New York, off the Delaware Capes, a speed of 17.1 knots was reached, which is to be compared with the designed speed of $16\frac{1}{2}$ knots.

The speed of the high pressure turbine at the designed propeller speed is 4685 revolutions per minute, and of the low pressure turbine 3445 revolutions per minute. The reversing element, which develops 3000 shaft horsepower, is located in the low pressure turbine casing.

Steam is supplied to the turbines at 375 pounds per square inch gauge pressure, and with 233 degrees Fahrenheit of superheat. The turbines exhaust to a vacuum of $28\frac{1}{2}$ inches.

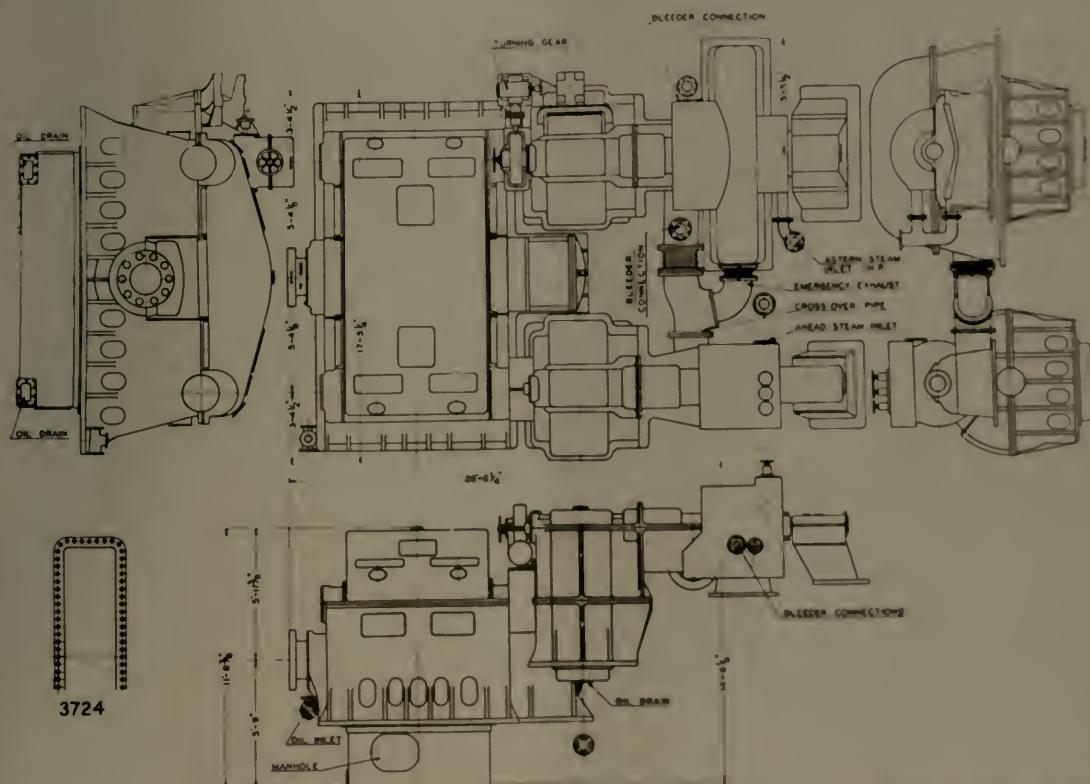
The high pressure turbine is provided with two extraction openings, one for steam at 200 pounds pressure when developing 8000 horsepower, and the second for steam at 90 pounds gauge, bled steam being used in stage feed water heaters and for other purposes.

The high pressure turbine casing is constructed of steel and the low pressure turbine casing of steel and nickel bearing semisteel.

The high speed gear case is made of semisteel, as is also the low speed gear case. The cover of the low speed gear is of steel plate and semisteel.

High speed pinions are located at the top of the high speed gear, and the low speed pinions are elevated from the center line of the low speed gear, as shown by the drawing. The gears themselves are of the standard De Laval conventional design, with a seamless rolled band shrunk on semisteel spiders.

The main thrust bearing is of the Kingsbury type and is located on the forward end of the low speed gear. The complete turbine and gear units each weigh 275,000 pounds.



Arrangement drawing with over-all dimensions of the 8000-horsepower De Laval compound marine type turbine and double reduction gear.

Pumps for Marine Service

By I. W. Jackman,* O. H. Dorer, H. M. Chase**

Part VII.—General Service Pumps

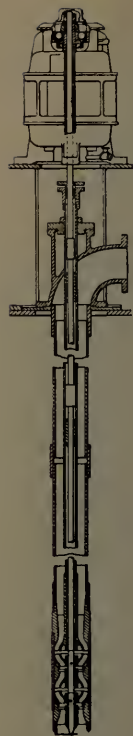
BILGE pump service demands a self-starting pump in most cases. For this the vertical arrangement of centrifugal pump is advantageous. The layout of suction piping to various compartments is more or less complicated, making it desirable to arrange oppositely disposed suction nozzles in duplicate on the pump casing. Usually the casing is vertically split so the rotor can be removed sidewise and disconnected from the driving motor by a coupling. Thus the suction and discharge nozzles would be located on the back half of the casing. Only one stuffing box is employed similar to condensate pump construction with a top suction impeller. The impeller should be extra wide to pass dirt and waste and, of course, must be self-starting by employing an air removal pump for evacuating the air at the moment of starting. One to two minutes is usually required to start the pump, with an average length of suction piping. The lift to the pump may not be over 5 feet, but the air removal apparatus must be capable of lifts of at least 20 feet due to the increased lift—caused by friction in the suction pipe—when the flow is being established. Thus it requires the air pump to keep pace with this lift during the process of priming and starting.

The air removal pump is of the rotary type attached to the driving shaft by gears. This pump is preferable when employing water as an operating medium and is not damaged in case water reaches it from the bilge pump casing during or after the priming period. A float valve is used to isolate the air pump after priming is provided.

A submersible bilge pump is of the same type but arranged with an air enclosing bell over the motor to protect the latter. The functioning of this device is to compress the entrapped air, and the location of the motor should be higher than ordinary so the volume of air is sufficient in the compressed state to still keep water away from it. This means for a 40-foot possible submergence that the air bell should be about two and one-half times as high as the motor. Cooling of the entrapped air is by means of the surrounding water by convection, and during operation without submergence, air can circulate through from the bottom of the bell by suitable passageways.

A horizontal self-priming centrifugal unit is not suitable for submersible service but can be used for ordinary standard bilge service. In this pump the priming element is located between the motor and the pump proper, giving a self-contained unit. The priming proceeds as previously described, and the water rises in the suction chamber containing the ball float valve or

Vertical sectional elevation of motor-driven Coniflo impeller type of general service liquid cargo pump. This type of pump is in general use for bulk liquid cargoes both in the built-in type of installation and as a portable unit.



suction controller. Its function is to prevent water from passing over into the air pump. The operation of the ball float permits air to be drawn into the air pump. If the pump loses the suction, the ball float recedes and again establishes the air removal pump action. Such equipment is available in capacities up to 700 gallons per minute and heads up to about 35 feet.

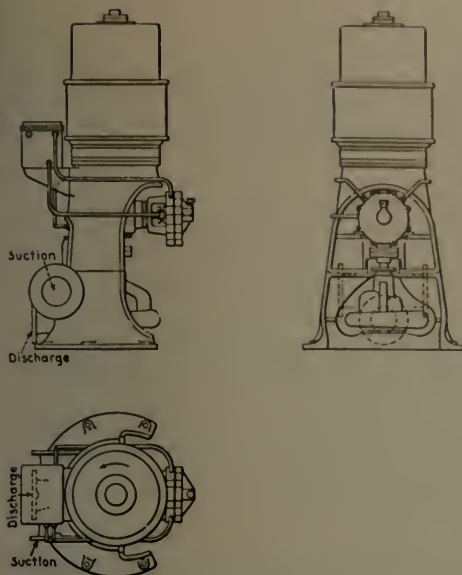
Reciprocating.—This is a service in which the pump may at times over-pump its supply and lose its suction. For this reason, with reciprocating types, although duplex direct-acting pumps are used to some extent, the simplex direct-acting is to be preferred. In case of lost suction it will continue to operate at full stroke and pick up suction again when supply is available more readily than the duplex type. Under such conditions, the duplex pump short-strokes and does not as readily free itself of air. Steady discharge flow is immaterial, but suction ability is important. The simplex will have a lower steam consumption than the duplex for equivalent work. The simplex pump is better adapted to operate without lubrication in the steam cylinders, thus allowing return of the exhaust to the feed system.

Although the bilge service is low pressure, the pump is in some instances built with a ratio of cylinders which permits of its use as a fire pump in emergencies.

For motorships, the bilge pumps are of the reciprocating power type on account of their self-priming ability, and are usually either horizontal duplex piston pattern or vertical triplex outside packed. The pump is direct-driven through double reduction gears by a motor mounted on the pump frame, making a self-contained unit. With the further improvement in reliability of worm gears, the motor-driven bilge pump will undoubtedly be built with this type of drive tending towards noiseless operation.

*Manager, Marine Sales, Worthington Pump and Machinery Corp.

**Paper read at Annual Meeting of the Society of Naval Architects and Marine Engineers, November 19 and 20, 1931.



Elevations and plan of vertical self-priming pump.

Ballast Pumps

Centrifugal.—The same types of pumps can be used for ballast service as for main circulating service. In particular cases a self-priming attachment may be added if the pump must be started with a suction lift and there is no means of flooding the pump from the ballast tanks. The more common type is the steam pump for this service, due to its lower cost and operating time factor.

Reciprocating.—This pump serves the ballast tanks and may be used for other low-pressure services as bilge, sanitary, or auxiliary condenser circulating. The suction supply is constant and, where steam pumps are used, they may be either horizontal duplex or vertical duplex or simplex. The duplex will generally give the large capacity required with a pump requiring less space and costing less than a simplex of equal capacity.

The percentage of operating time is small, and the better operating economy obtained with a pump of higher efficiency is not sufficient to warrant the higher installation cost. For this reason, and on account of large space requirements, the installation of motor-driven reciprocating power pumps for this service is generally confined to motorships. Here the power pump is of either the horizontal duplex or vertical triplex type, the selection depending largely on the space available and the cost of installation. In either case, a constant speed, hand-controlled motor is mounted directly on the pump frame and drives the crankshaft through double reduction gears.

Fire Pumps

Centrifugal.—The fire pump is usually connected so it can also be used as a general service pump, operating at 150 pounds for fire service and about 75 pounds for general service. The more common type has been a two-stage pump operating at 1,750 revolutions per minute, but with the standardization of 3,500 revolutions per minute direct current motors, the single-stage pump today offers an attractive solution for this

service. The higher speed results in less cost, weight, space and smaller foundations and is accompanied with equal reliability.

Reciprocating.—There are many vertical simplex direct-acting steam pumps installed for fire service due to limited weight and space, but the duplex pump, either vertical or horizontal, finds favor, due to its simplicity of parts and its absolute dependability of starting after long periods of standing idle. The steam thrown valve of a simplex pump operates satisfactorily when kept in condition, but, inasmuch as the pumps usually operate without lubrication, the possibility of the valve gear sticking at the start must be considered. On other services where pumps are in constant use, this is not liable to occur, but if it does, there is time to correct any difficulty; but when a fire stream is wanted and operators are more or less excited, the pump must start on the opening of the throttle. Furthermore, the duplex pump produces a steadier stream and can be run at high speeds. The slight extra weight and increased space over the simplex pump are offset by the above features.

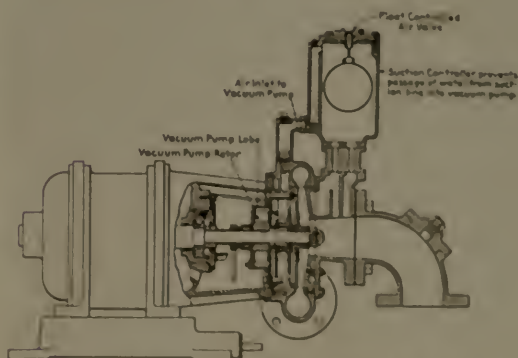
Fresh, Ice, and Potable Water Pumps

Centrifugal.—The capacities for these services are in general small, while the pressures range from 50 to 100 pounds, necessitating the use of two-stage pumps. These pumps will operate at 1150 to 1750 revolutions per minute and on the left-hand end of the head capacity curve, resulting in comparatively low efficiencies. The use of single-stage pumps at 3500 revolutions per minute will result in considerable increase in over-all economy. On some of the services the use of self-priming pumps is essential.

Reciprocating.—These pumps are in practically continuous service, and the higher efficiency of the motor driven unit makes it preferable to the direct-acting steam pump. There is generally a considerable suction lift. The motor-driven reciprocating power pump, either horizontal duplex or vertical triplex, is admirably suited to the suction requirements, and in the relatively small capacities and heads required will show a saving in power over other types and allow the use of a smaller motor.

As the demand is subject to sudden variations, the pump is run at constant speed with overflow of surplus discharge back to the suction supply. This permits the use of constant speed motor with the usual manual start and stop control.

(To be continued)



Sectional elevation of horizontal self-priming pump.

A Solution of Some Marine Commissary Problems

Frosted Food Process of Production Control, Quick-Frosting, and Air- and Moisture-Proof Wrapping, Preserve Indefinitely Texture and Flavor of a Large Variety of Fish, Meat, Fruit, and Vegetable Products

ON long ocean voyages, and especially those where the route lies wholly or partially in the tropics, the provision of a variety of fresh, tasty viands for passengers and crew is one of the most pressing problems.

Modern refrigeration equipment has practically guaranteed freedom from spoilage and contamination, but the wish of alert management, on passenger lines especially, goes further. The problem and the consequent search have involved the flavor and appetizing qualities of the foods so held in refrigeration. For it remains a fact that after a few weeks in a ship's cold storage chambers, most foods seem to acquire a dead level of flavor, and sometimes an absence of flavor. The effect of this phenomenon, the reason for which has not until recently been distinctly established by scientific research, has been evident in the substitution of attractive presentation of the food to the eye for the missing flavor to the palate. Expert chefs are working wonders in restoring to a remarkable degree the original flavors of some meats; but many a chef on a palatial and perhaps world-renowned liner finds himself tempted to become a scenic designer of dishes, rather than a gastronomic master of flavor.

Ever since the introduction of reliable refrigerating machinery, the problem has been increasingly brought under control; and to-day the course of investigations has led entirely away from shipboard, and is leading to what happens to the foods before they go to market. Holding foodstuffs at low temperatures on shipboard is no longer a problem; the problem now is to bring them into the ship's cold chambers in such shape that they will, when brought to the temperature of the outer air, return to their fresh state, in flavor and texture.

Important among recent researches along this line stands the study of quick-frosting methods which has resulted in the Birdseye Quick-Frosting process. This research has been carried on by Frosted Foods Company, a subsidiary of General Foods, formed to develop the Birdseye patents into practical application. This research along systematic scientific and engineering lines has led to the practical solution of the problem with a large variety of meats, sea-foods, vegetables, fruits, and poultry—with special significance for marine use and installations.

As now developed, the Birdseye process prepares selected food products for the cook or for the table; wraps these uncooked prepared products in air- and moisture-proof cellophane wrappings; quick-frosts these packages and their contents at temperatures lower than 50 degrees below zero; and holds them at zero until delivered to the consumer, or, in the case of marine use, until they are withdrawn by the chef for actual use aboard ship.

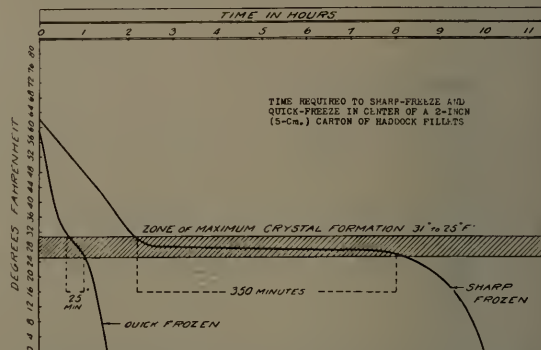


Diagram illustrating the time difference between ordinary quick-freezing and quick-frosting under the Birdseye patent process.

The outstanding thing about this process is that the control of cold is so managed that when the foods are returned to room temperature they simply return to their fresh state—both as regards texture and flavor.

It is evident that this system involves five distinct steps, which we shall briefly examine one by one.

1. Selection and Production Control

Very early in the laboratory research, it became evident that uniformity in the products to be quick-frosted was an essential; and this led to the necessity of selection of seeds and breeds, together with arrangements for their continued supply, as well as choice of locality and careful control of production. As most of the products are seasonal, production schedules became of vital importance, and anticipation of at least a year's needs became a major issue. Surveys of the entire continent were made to discover the best localities for raising the various raw materials — beef cattle, sheep, poultry, shell-fish, berries, fruits, and vegetables of the most satisfactory brands and breeds. In the center of each of these localities plants were established and equipped in accordance with the crops and products. Contract arrangements were entered into with responsible growers so that seed and breed control and production control became accomplished facts. This control even goes so far as to provide the company with its own trawlers for deep-sea fish, to protect the prime condition of the sea-foods that are to be provided for the table of the epicure.

2. Preparation of the Product

The ideal of providing foods completely prepared for cooking was early established and, to this end, all production schedules and plans have included the elimina-

tion of waste material prior to frosting under the Birdseye process. Peas are shelled, spinach is picked and washed, fruits are ready for the table, fowls are dressed, and the major portion of the waste bone of meats is removed. All pods, stems, dirt, and imperfections are eliminated. All meats are properly aged. Corn is removed from the cob. The fact that this work is done before frosting produces a package which contains all-eatable food, with all preparation done in central, mechanized plants. As a practical matter in marine use, fewer hands are required to place before passengers and crew perfectly prepared food.

3. Packaging of Product

There are three distinct parts to the package in which Birdseye Frosted Foods reach the market—the package itself, of waxed cardboard; an inner wrapping of moisture-proof and air-proof cellophane, specially developed by Du Pont for this use; and an outer wrapping of tightly-sealed waxed paper. This package is the result of laboratory research involving all sorts of storage and handling conditions, with especial attention to exposure to low temperatures over long periods of time. Both evaporation and oxidation—the two enemies of flavor—are effectively barred from the foods by this “three-way” packaging. It is important to note that the foods are packaged before frosting, with the result that they go immediately from the froster into zero storage, from which they do not emerge until ready for use. Thus it is that they retain all their original characteristics of flavor, aroma, and texture and are safe from contamination by other flavors.

4. Birdseye Quick-Frosting

Immediately upon packaging, these foods go into the froster, in which they are carried between and in close contact with two endless monel-metal belts. These belts are, in turn, in constant contact with calcium chloride brine at temperatures as low as 50 degrees Fahrenheit below zero. These belts move slowly, so that when the foods reach the other end they are solidly frosted in their packages and they are then in permanent form until they are defrosted and returned to their fresh state.

Briefly and nontechnically, the difference between this Birdseye Process and ordinary “slow” or “sharp” freezing processes is as follows:

All food materials are made up of microscopic cells. Each cell contains water in which are dissolved salts, proteins, and other food materials. When foods are subjected to freezing temperatures, the water in the cells is turned to ice. Ice is a crystalline substance, and the size and shape of the crystals depends upon the rapidity with which it freezes. Thus, in ordinary, air-exposure or other types of slow or “sharp” freezing, the formation of ice crystals takes from 5 to 6 hours, and the resulting crystals are large and pointed. These points puncture the cell walls of the meat, fish, or poultry tissues, and then when the foods frozen by ordinary methods are thawed out the cell juices (again reduced to liquid) ooze out and are lost. With them goes the flavor and nutritive value of the food.

Just the opposite takes place when the freezing is by the Birdseye method—for the temperature applied is so terrifically low that the large crystals do not have time to form, and a number of small crystals form instead, which do not puncture the meat, sea-food, or poultry cell walls. Then, when the Birdseye quick-frosted foods are defrosted, the foods simply return to their fresh state with the flavor juices retained in the food cells.

This may be pictured graphically. When foods are passed from 32 degrees Fahrenheit downward, the crystals begin to form. Most of them form in the zone from 31 to 25 degrees Fahrenheit, the so-called “zone of maximum crystal formation.” The size and sharpness of the crystals vary directly with the length of time the foods remain in this zone. The accompanying chart represents the passage of foods through this zone, in the case of Birdseye Frosted Foods, which pass through it in from 20 to 25 minutes, and ordinary “slow” or “sharp” frozen foods, which may take as long as six hours. This is the critical zone for flavor—and texture-preservation.

5. Storage at Zero

The last stage of the system—holding at zero Fahrenheit—is not so great a problem on shipboard as it is in retail establishments ashore. It is interesting to note that in the experimental work leading up to the design and manufacture of a combined show-case and cabinet, some very definite contributions were made to the art of refrigeration engineering, and the special knowledge thus gained is available for the improvement of the refrigeration plant aboard ship.

It will be evident at once that a ship equipped with refrigeration capacity to hold at proper temperatures the provisions as now supplied for a long voyage would have ample capacity to take care of foods prepared by the Birdseye system. Bulk and weight are much less because of waste material elimination, and there is no transfer of moisture to or from these foods and the air in the refrigeration chamber. In fact, refrigeration cabinets and chambers designed especially for Frosted Foods show much less power consumption for holding at zero Fahrenheit than many standard construction chambers handling unwrapped raw food products can show for holding at points just below 32 degrees Fahrenheit.

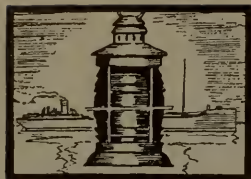
This Frosted Foods system has not yet been extended to cover all varieties of food product. At the present time foods under control for perfection of product include: Beef, veal, mutton, lamb, pork, and poultry in all raw forms; All the widely used American seafood fish; Oysters, clams, scallops; Peas, beans, corn, spinach, carrots, mushrooms; Raspberries, blueberries, cranberries, strawberries, cherries.

Marine Advantages

There are several advantages in the use of foods prepared by this system that are especially interesting to marine operators.

- (1) Elimination of waste; saves much space and much weight for possible revenue-producing freight
- (2) Foods ready for use; fewer hands needed to man the cuisine; enables emergency calls for meals to be met without wastage.
- (3) Air- and moisture-proof wrappings; insures fresh flavor and aroma of all foods and satisfied passengers.
- (4) Nation-wide selection and control—insures best possible quality, flavor, and texture in each variety—again resulting in satisfied passengers.
- (5) Low over-all costs: elimination of spoil and wastage; foods can be cooked without separate defrosting.

Considering all of these points, it is not surprising that many intelligent passenger ship operators are showing great interest in the Frosted Foods Sales Corporation which is developing markets for these products on the Pacific Coast.



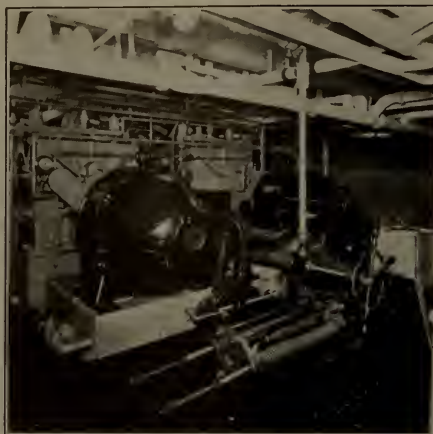
Marine Equipment

Steering America's Greatest Liner

American Engineering Company supplied to the T. S. S. Manhattan and the T. S. S. Washington, super-combination cargo and passenger liners built for the United States Lines by the New York Shipbuilding Company, the main steering gear and three warping capstans for each ship.

Our illustrations show the steering gear, which is of the electro-hydraulic, 4-cylinder, double-ram type. This gear is arranged with two pair of 20-inch bore cast steel cylinders set parallel to the center line of the ship and forward of the rudder stock. Each cylinder of a pair is bolted to a structural steel foundation common to the pair, and the two cylinders are yoked and bolted together. A forged steel, turned and polished ram is operated by each pair of cylinders. This ram carries at its center a trunnion which is link-connected top and bottom to the tiller on the rudder stock.

This gear is actuated by duplicate Hele-Shaw variable stroke ro-



The steering gear compartment on the T.S.S. Manhattan, featuring the twin installation of Westinghouse 90-horsepower motors driving Hele-Shaw high pressure hydraulic pumps.

tary cylinder high pressure hydraulic pumping units, each direct-connected through flexible coupling to a 90-horsepower, 230-volt, 1000-revolutions per minute, constant speed, shunt wound Westinghouse motor. Each of these driving units has full capacity to operate the steering gear under most difficult conditions.

The hydraulic pressure required

to hold the torque of the rudder when hard going ahead is 585 pounds per square inch, and when going astern 1600 pounds per square inch. All piping, pumps, and ram cylinders were tested to 2200 pounds per square inch.

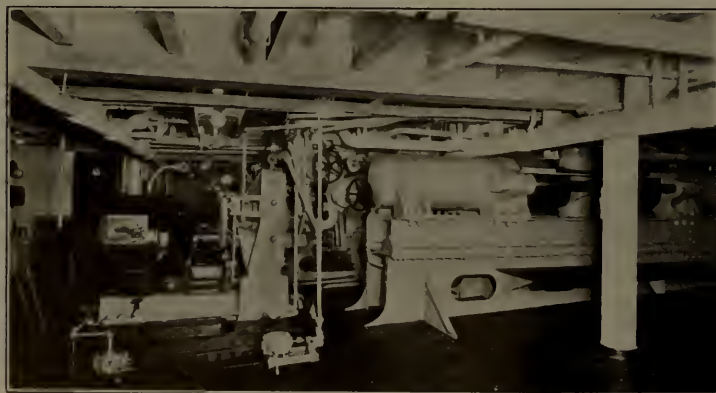
Steering is controlled from the wheelhouse by a single hydraulic telemotor system. A limit stop automatically throws the pump spindle to neutral and equalizes the liquid pressures in the system should the rudder reach $1\frac{1}{2}$ degrees past the maximum allowable helm angle.

The three warping capstans on each ship are located on C Deck aft, have 26-inch gypsy heads, driven through spur and worm gearing by 75-horsepower motors, and are each capable of exerting a 20,000 pound pull on a warping hawser. Two of these capstans have an extension vertical shaft with motor on deck below, the other has motor mounted on same bed plate as the gypsy head. The gear journals run in ball bearings, and the gypsy head journals in bronze bushings.

Eleven-Pound Light Ten-Mile Beam

IN addition to other methods of communication, the U.S.S. Macon, sister airship to the Akron, will have a special signalling searchlight, weighing a bit over 11 pounds and capable of projecting its 380,000 candlepower beam nearly ten miles under favorable conditions. The unit, most efficient for its weight in the world, will be used to signal from the airship to the ground just as battleships now use their giant searchlights to communicate with one another.

Custom built in the engineering laboratories of the Westinghouse Electric & Manufacturing Company at Cleveland, this searchlight is about 14 inches in diameter, a little more than 13 inches deep, and weighs only 11 pounds, 4 ounces. The unit is made almost entirely from hard drawn aluminum, with a reflector of chromium



View of the American Engineering Company's electro-hydraulic steering gear on the T.S.S. Manhattan.

plated sheet brass drawn to the form of a modified parabola. The lenses are made of safety glass ground and polished on both sides. A 500-watt, 115 volt, motion picture projection lamp, of the same type as used in home movie projectors, provides the light.

An idea of the terrific concentration of light in the unit may be gained when comparing it with the most efficient night baseball installation at the Seals' Stadium, San Francisco. This installation consumes 362 000 watts, or 725 times that used in the U.S.S. Macon unit and produces an average candle power of 565,000, as compared with 380 000 maximum in the airship searchlight.

In signalling, nine aluminum shutters, which resemble the familiar Venetian blinds, are opened and closed by a trigger to send out light signals in Morse Code. The shutters may be opened and closed approximately 300 times per minute, although original specifications required a speed of only 185 operations for acceptance.

It is interesting that when the specifications were first drawn up, some engineers stated that it was impossible to build a unit so small in size which embodied all the mechanical features desired and still would weigh not more than fifteen pounds. When Westinghouse completed the unit, with lamp installed and twenty feet of cable, its weight was three pounds, twelve ounces under the limit.

Answering Many Packing Problems

DESCRIBING it as "the answer to many packing problems that had never been solved satisfactorily," the Garlock Packing Company has announced the development of a number of packing items such as diaphragms, disks, and gaskets made of various Thiokol compounds.

This material, a new chemical product, has most of the characteristics of rubber but is not affected by solvents and does not oxidize. Because of this it is exceptionally fitted for use in packings, where rubber coming in contact with solvents would quickly disintegrate.

The new Garlock packings made of the Thiokol compounds are advocated in place of rubber especially where they are to be employed near such materials as gasoline,



Some of the forms of the new Thiokol packing manufactured by Garlock Packing Company.

ether, kerosene, carbon tetrachloride, and gas. Tests of the new material have shown that, in joints, flanges, and valves the Thiokol packings are superior not only to rubber but also to leather and metal.

According to the manufacturers, no sign of deterioration has been found in the new packing items even when in use for long periods of time. This will result in immense savings by users of machinery, since expensive replacements of packings will be no longer necessary. It is pointed out that pipeline operators will find the new packings a great benefit, since they will minimize the necessity of expensive excavating to get at the pipes for repairs.

Because of their unusual practicality in the petroleum industry, Thiokol packings for this field are being featured in the Garlock line. Disks made of this material have been found particularly successful in the automatic valves used in gasoline dispensing stations on filler hose, tank wagon valves, and in ordinary pipeline valves handling gasoline, benzol, and other rubber solvents.

Cutting Attachment for Welding Torch

IN accordance with the economic requirements of manufacturing under present conditions, the Smith Welding Equipment Corporation has placed upon the market a new cutting assembly, or attachment, for a welding torch called the "Money Saver" cutting assembly.

To maintain the efficiency of the cutting assembly and set to manufacture it at a considerably less cost was the problem involved.

The design of this cutting assembly has eliminated such customary features as levers for the cutting oxygen and adjustable unions to change the position of the assembly in the handle and has substituted for these features very simple valves.

The cutting oxygen valve is a triple thread, screw valve with knurled wheel so arranged that it can be quickly opened and closed with the thumb. The valve forging has been reduced to the simplest possible design and the cutting tip automatically evens up the flame. Double seats and all other parts not absolutely essential to operation have been eliminated, resulting in simplicity of construction and in manufacturing costs far less than the conventional type of cutting assembly. This new assembly has been approved by the Underwriters' Laboratories.

Trade Notes

G-E. Appointment. — Louis E. Underwood, managing engineer of the stationary motor engineering department of the General Electric Company at Lynn, Massachusetts, has been appointed manager of the Pittsfield works of the company to succeed E. A. Wagner, who has retired, it has been announced by Vice-President W. R. Burrows, in charge of manufacturing.

Mr. Underwood was graduated from Sheffield Scientific School of Yale University in 1896 and joined the General Electric organization in 1897.

Paint Company Announcement. — Tarr & Womson, Ltd., oldest manufacturers of copper bottom paint in this country, announce the expansion of sales of their well known antifouling brown paint for wooden bottoms to the steam schooner trade, service West Coast ports with large stock both at San Francisco and San Pedro.

T & W Red Racing Compound has been for over 70 years extensively used in the pleasure boat field on the Pacific Coast, and this same high quality is contained in their liquid brown paint also.

The company is represented in California by the Roland E. McCune Company of 231 Sansome St., San Francisco.



American Shipbuilding

Edited by H. C. McKinnon

New Swayne & Hoyt Steamer.—Bids may be asked in December for the construction of a combination passenger and freight vessel for the Gulf Pacific Mail Line operated by Swayne & Hoyt, Ltd., 215 Market Street, San Francisco. The vessel must be built under the requirements of Mail Contract for Route 33 granted to this company by the Post office Department. The route connects the ports of the Pacific Coast of North America with the ports of the Gulf and Caribbean Sea, including Tampico, Puerto Colombia, and Kingston. Under the terms of the contract two vessels were to be reconditioned to increase their speed and one vessel was to be built with capacity for 7500 tons deadweight and accommodations for 20 passengers. The two reconditioned vessels are about completed and are entering service. They are the Point Ancha and Point Lobos, described elsewhere in this issue.

The new vessel to be constructed by Swayne & Hoyt will have the following general characteristics:

Length between perpendiculars	400 feet
Beam molded	59 feet
Depth molded to shelter deck	38 feet
Draft molded	24 feet
Displacement, tons ..	12,000
Deadweight capacity, tons ..	7500 to 8000
Horsepower	4000
Speed trial, knots	14
Speed sustained sea, knots...	13
Passenger capacity ..	12

According to the plans of the owners, the passenger accommodations are to be arranged so that they may be enlarged to accommodate 20 with very little change in structures.

The power plant has not yet been decided upon.

Dredges for U. S. Engineers. — The U. S. Engineers, War Department, Washington, D. C., are reported to be planning the construc-

tion of several dredges for river work. One is to be a new type shallow water suction dredge for the Upper Mississippi, one a cutter type suction dredge for the Ohio River, and a third is to be a self-propelled duplex suction dredge for Lower Mississippi River service.

Steel Fabrication for Bay Bridge.

—With the bids soon to be asked for the construction of the San Francisco-Oakland Bay Bridge at a cost of \$75,000,000 by the State of California Toll Bridge Authority, 500 Sansome Street, San Francisco, the shipyards around San Francisco Bay are looking forward to some nice contracts for the fabrication of steel.

While bids will be open to steel manufacturers and contractors in all parts of the country, there is a certain amount of fabrication which must be done locally due to the size of the structures. The steel pontoons which will form the piers and main anchorage of this bridge will of necessity be formed ready to be sunk into the bay in the shipyards or drydocks nearby, and this presents a good opportunity for the local shipyards to place their bids for the entire work of fabricating and manufacturing these pontoons. About 15,000 tons of steel will be used in the structures to be floated into place for the piers of this bridge.

Tanker Damaged.—The Union Oil Company's tanker Cathwood was extensively damaged when she grounded last month on Montuosa Islet reef near Panama. Her cargo is being transferred to the tanker De Roche at Balboa. William Groundwater, manager of the marine department, left San Francisco for Balboa on the steamship Talamanca October 15 to supervise a survey of the vessel and to make a decision as to her repairs.

To Convert Vessel. — The U. S. Bureau of Indian Affairs, Department of the Interior, is planning to convert the schooner Boxer for

work as a hospital ship for service in Alaska. The Boxer is a veteran supplyship for the department's activities in Alaska and was decommissioned this year on completion of the fine new motorship North Star.

The vessel will be equipped to carry physicians, dentists, and nurses ready to give medical attention to white settlers and natives of the isolated little villages of the Alaska Coast, and a hospital ward will be constructed in the forward part of the ship.

J. R. Ummel, office manager and purchasing agent for the department at Seattle, with offices at 422 Bell Street Terminal, will open bids about the first of November.

Todd Gets Conversion Contract.

—Todd Dry Docks, Inc., Harbor Island, Seattle, has been awarded contract for the conversion of the steel cables ship Dellwood into a cannery tender at a cost of about \$75,000. The vessel was purchased from the Shipping Board by P. E. Harris & Co. of Seattle and will use the tender in connection with its Alaska canneries. The cable tanks and other cable equipment aboard the Dellwood will be removed and space for cannery supplies will be installed, as well as accommodations for 300 cannery workers.

Repairs to Tanker.—General Engineering & Drydock Company, Oakland, Calif., was recently awarded contract for general repairs to the Associated Oil Company's tanker Frank H. Buck on a low bid of \$27,398. Other bidders for this work were: Bethlehem Shipbuilding Corp., Ltd., \$29,860; Moore Dry Dock Company, \$30,478.

General Engineering & Drydock Company also has the job of reconditioning the Coast Guard cutter Tahoe, including annual overhaul and some changes to propulsion. This work will cost \$11,663.

According to an official message from the Santa Rosa after her trials, all guaranteed horsepower, revolutions, and speed were easily

met. The speed of 20.05 knots was made at 14,350 horsepower, with turbines throttled. It is believed the ship could safely develop close to 21 knots with 16,000 horsepower.

Order for Barges.—Dravo Contracting Company, Pittsburgh, Pa., has received contract from the U. S. Engineer's Office, Washington, D.C., for two steel barges, 80 x 26 x 6 ft. to cost \$14,750 for the two.

Navy Yards Assigned Destroyer Work.—The U. S. Navy Department has announced that three destroyers will be built, one each in the New York, Boston, and Philadel-

phia navy yards.

These destroyers were authorized by Act of August 29, 1916, and the Navy Department has announced that the work is being undertaken partly to give steady employment to personnel of the navy yards and partly to replace over age ships with new ones.

These destroyers will be 341 feet long, 34 feet beam, and of 1500 tons displacement, with twin screws and steam engine powered. Cost will be about \$4,000,000 each.

Santa Rosa has Successful Trials.—A speed of 20.05 knots was at-

tained by the new Grace liner Santa Rosa, October 11, when she had her official speed trials off Rockland, Maine. She is the first of four new ships built by the Federal Shipbuilding & Drydock Company at Kenney, New Jersey, for the Panama Mail service of the Grace Lines.

The Santa Rosa is an electric ship, equipped with turbine-gear propulsion apparatus and motor and control for auxiliaries of General Electric manufacture. She is 508 feet long, has a beam of 72 feet, displacement of approximately 16,000 tons, and may have a

STATUS OF NEW VESSEL CONSTRUCTION

Owner of Vessel	Name of Vessel	Type	Gross Tons	D. W. Tons	Propulsion	Speed	Builder	Launched	Delivered	Authorized Loan from C. L. F.
American Line S.S. Corp. and Atlantic Transport Co. of W. Va. (Panama Pac. L.)	(a) California	Comb.	20,325	15,300	Turbo El.	18	Newport News S. B. & D. D. Co.	10 1 27	1 18 25	\$2,000,000.00
	(a) Virginia	Comb.	20,773	15,500	Turbo El.	18	Newport News S. B. & D. D. Co.	5 18 28	11 20 28	2,000,000.00
Cherokee Steamship S.S. Corp. and Clyde S.S. Co.	(a) Algonquin	Comb.	5,913	3,005	Turbine	14 1/2	Newport News S. B. & D. D. Co.	9 9 26	12 10 26	9,250,000.00
	(a) Cherokee	Comb.	5,905	2,930	Turbine	14 1/2	Newport News S. B. & D. D. Co.	10 2 25	8 1 25	1,000,000.00
	(a) Seminole	Comb.	5,890	2,930	Turbine	14 1/2	Newport News S. B. & D. D. Co.	4 14 25	8 15 25	1,000,000.00
	(a) Comanche	Comb. Rfr.	7,057	4,900	Turbine	15 1/2	Newport News S. B. & D. D. Co.	7 22 25	12 21 25	1,000,000.00
Comco S.S. Corp. and New York & Porto Rico S.S. Co.	(a) Boston	Comb.	4,090	800	Turbine	19	Bethlehem S. B. Corp. Ltd.	10 27 23	3 27 24	912,000.00
Eastern S.S. Lines, Inc.	(a) New York	Comb.	4,090	800	Turbine	19	Bethlehem S. B. Corp. Ltd.	1 12 24	6 2 24	912,000.00
*General Motors Corp.	(a) Cleveland	Frt.	1,460	2,325	Mot.-El. Aft	10 1/2	Great Lakes Engineering Works	7 1 23	10 1 23	200,000.00
	(a) Detroit	Frt.	1,460	2,325	Mot.-El. Aft	10 1/2	Great Lakes Engineering Works	7 31 23	10 17 23	200,000.00
New York & Miami S.S. Corp. and Clyde S.S. Co.	(a) Iroquois	Comb.	6,209	3,000	Turbine	18	Newport News S. B. & D. D. Co.	12 11 26	5 12 27	1,197,000.00
Nova Scotia S.S. Corp. and Clyde S.S. Co.	(a) Shannon	Comb.	6,209	3,100	Turbine	18	Newport News S. B. & D. D. Co.	4 10 27	7 21 27	1,197,000.00
	(a) Evangeline	Comb.	5,943	930	Turbine	18	Wm. Cramp & Sons Ship & Engine Bldg. Co.	2 12 27	10 3 27	950,000.00
	(a) Yarmouth	Comb.	5,013	930	Turbine	18	Wm. Cramp & Sons Ship & Engine Bldg. Co.	11 6 26	7 6 27	950,000.00
Robert E. Lee S.S. Co. and Old Dominion S.S. Co.	(a) Robert E. Lee	Comb.	5,114	2,175	Turbine	16	Newport News S. B. & D. D. Co.	10 16 24	1 3 25	1,000,000.00
Argo Navigation Co. and Atlantic Gulf & West Indies S.S. Lines	(a) Moro Castle	Comb.	11,520	7,025	Turbo El.	20	Newport News S. B. & D. D. Co.	3 8 30	11 30 30	1,422,000.00
	(a) Orient	Comb.	11,520	6,909	Turbo El.	20	Newport News S. B. & D. D. Co.	5 15 30	11 21 30	1,400,000.00
American Line S.S. Corp. and Atlantic Transport Co. of W. Va. (Panama Pac. L.)	(a) Pennsylvania	Comb.	20,529	18,000	Turbo El.	18	Newport News S. B. & D. D. Co.	7 10 29	10 10 29	4,700,000.00
American South African Line	(a) City of New York	Comb.	8,272	4,100	Motor	14	Suo. S. B. & D. D. Co.	10 10 29	1 10 30	1,300,000.00
Comco S.S. Corp. and N. Y. & Porto Rico S.S. Co.	(a) Boringham	Comb. Refrig.	7,114	4,500	Turbine	15 1/2	Bethlehem S. B. Corp. Ltd.	9 24 30	2 20 31	1,979,410.00
Colombian Mail S.S. Corp. and Colombian S.S. Co., Inc.	(b) Colombia	Comb.	5,200	4,440	Turbine	15 1/2	Newport News S. B. & D. D. Co.	8 6 32	11 17 32	1,807,000.00
	(b) Haiti	Comb.	5,200	4,440	Turbine	15 1/2	Newport News S. B. & D. D. Co.	9 17 32	12 13 32	1,807,000.00
Dollar S.S. Lines, Inc., Ltd.	(a) President Hoover	Comb.	21,036	15,000	Turbo El.	21	Newport News S. B. & D. D. Co.	12 8 30	7 1 31	3,502,000.00
	(a) President Coolidge	Comb.	21,036	15,000	Turbo El.	21	Newport News S. B. & D. D. Co.	2 21 31	10 1 31	3,500,000.00
Eastern S.S. Lines, Inc.	(a) Saint John	Comb.	6,185	2,200	Turbine	20	Newport News S. B. & D. D. Co.	1 9 32	4 22 32	2,310,000.00
	(a) Acadia	Comb.	6,185	2,200	Turbine	20	Newport News S. B. & D. D. Co.	4 13 32	9 7 32	2,310,000.00
Export S.S. Corp.	(a) Escalibur	Comb.	6,350	9,405	Turbine	16	New York S. B. Corp.	8 8 30	12 18 30	1,700,000.00
	(a) Eschoda	Comb.	6,350	9,405	Turbine	16	New York S. B. Corp.	10 16 30	1 13 31	1,700,000.00
	(a) Fairer	Comb.	6,360	9,405	Turbine	16	New York S. B. Corp.	4 4 31	8 21 31	1,700,000.00
	(a) Escamson	Comb.	6,360	9,405	Turbine	16	New York S. B. Corp.	8 28 31	8 21 31	1,700,000.00
Grace S.S. Co. and W. R. Grace & Co.	(a) Santa Clara	Comb.	6,640	7,000	Turbo El.	18	New York S. B. Corp.	11 14 29	1 1 30	2,454,730.00
Grace S.S. Co.	(b) Santa Lucia	Comb.	10,500	7,150	Turbine	18 1/2	Federal S. B. & D. D. Co.	10 1 32	2 9 33	3,071,264.00
	(b) Santa Elena	Comb.	10,500	7,150	Turbine	18 1/2	Federal S. B. & D. D. Co.	10 24 32	2 21 33	3,071,264.00
Motor Tankship Corp.	(a) Pacific Sun	Tanker	9,008	12,450	Motor Aft	11	Sun S. B. & D. D. Co.	12 2 29	12 26 29	1,200,000.00
	(a) Chester Sun	Tanker	9,008	12,450	Motor Aft	11	Sun S. B. & D. D. Co.	2 15 30	2 27 30	1,200,000.00
	(a) Western Sun	Tanker	9,100	12,450	Motor Aft	11	Sun S. B. & D. D. Co.	5 10 30	1 10 31	1,200,000.00
	(a) Eastern Sun	Tanker	9,100	12,450	Motor Aft	11	Sun S. B. & D. D. Co.	6 15 30	6 12 30	1,200,000.00
	(a) Northern Sun	Tanker	8,864	14,700	Motor Aft	11	Sun S. B. & D. D. Co.	1 11 31	2 11 31	1,200,000.00
	(a) Southern Sun	Tanker	8,863	14,700	Motor Aft	11	Sun S. B. & D. D. Co.	3 21 31	4 2 31	1,200,000.00
	(a) Mercury Sun	Tanker	8,863	14,700	Motor Aft	11	Sun S. B. & D. D. Co.	12 8 31	12 17 31	1,200,000.00
	(a) Manhattan	Comb.	24,280	12,000	Turbine	30	New York S. B. Corp.	12 8 31	7 27 32	7,607,000.00
North Atlantic S.S. Co. and U. S. Lines Co.	(a) Mariposa	Comb.	18,017	11,000	Turbine	21	Bethlehem S. B. Corp. Ltd.	7 18 31	12 14 31	3,000,000.00
	(a) Monterey	Comb.	18,017	11,000	Turbine	21	Bethlehem S. B. Corp. Ltd.	10 10 31	4 26 32	3,000,000.00
	(a) Larkspur	Comb.	18,800	11,200	Turbine	30	Bethlehem S. B. Corp. Ltd.	7 18 32	1 1 33	3,000,000.00
Panama Mail S.S. Co.	(b) Santa Rosa	Comb.	10,500	7,150	Turbine	18 1/2	Federal S. B. & D. D. Co.	3 24 32	11 17 32	3,071,264.00
	(b) Santa Paula	Comb.	10,500	7,150	Turbine	18 1/2	Federal S. B. & D. D. Co.	6 11 32	12 20 32	3,071,264.00
Seatrail Lines, Inc.	(a) Seatrain N. Y.	Frt.	8,600	8,445	Turbine	15 1/2	Sun S. B. & D. D. Co.	6 11 32	1 18 33	1,100,000.00
	(b) Seatrain Havana	Frt.	8,600	8,445	Turbine	15 1/2	Sun S. B. & D. D. Co.	9 36 32	1 18 33	1,100,000.00
Tide Water Associated Transport Corp.	(a) Tide Water	Tanker	8,895	13,450	Motor Aft	11	Sun S. B. & D. D. Co.	8 6 30	4 15 31	1,000,000.00
	(a) Tide Water Associated	Tanker	8,812	13,450	Motor Aft	11	Sun S. B. & D. D. Co.	9 6 30	9 11 31	1,000,000.00
Transatlantic S.S. Corp. and United States Lines Co.	(b) Washington	Comb.	30,000	12,000	Turbine	30	New York S. B. Corp.	8 30 32	6 1 33	7,500,000.00
United Mail S.S. Co. United Fruit Co.	(a) Telemachus	Comb. Refrig.	6,953	4,000	Turbo El.	17 1/2	Newport News S. B. & D. D. Co.	8 18 31	12 12 31	2,500,000.00
	(a) Chiriqui	Comb. Refrig.	6,953	4,000	Turbo El.	17 1/2	Newport News S. B. & D. D. Co.	11 14 31	2 15 32	2,500,000.00
	(a) Amiga	Comb. Refrig.	6,982	4,285	Turbo El.	17 1/2	Bethlehem S. B. Corp. Ltd.	12 12 31	4 1 32	2,500,000.00
	(a) Oubanga	Comb. Refrig.	6,982	4,285	Turbo El.	17 1/2	Bethlehem S. B. Corp. Ltd.	2 4 32	4 1 32	2,500,000.00
	(a) Vagabond	Comb. Refrig.	6,982	4,285	Turbo El.	17 1/2	Bethlehem S. B. Corp. Ltd.	4 23 32	6 2 32	2,500,000.00
	(b) Pilot	Comb. Refrig.	7,000	4,000	Turbo El.	17 1/2	Newport News S. B. & D. D. Co.	8 13 31	2 15 32	2,500,000.00

(a)-New vessel, completed

(b)-New Vessel, not completed

*Loan made to Minnesota Atlantic Transit Company

t-Buried prior to completion at Saguenay

Table showing the status of new vessels built and building under loans authorized by the Construction Loan Fund of the United States Shipping Board.

scheduled speed rating up to 18 knots.

To Build Barges. — U. S. Engineer's Office, Chicago, Ill., will ask for bids soon for the construction of three oil barges to be 120 by 30 by 7 ft. dimensions.

Santa Lucia Launched. — The third of the four fine passenger and freight liners building for the Panama Mail Service of the Grace Lines, Ltd., was launched by the Federal Shipbuilding & Drydock Company on October 3. The Santa Lucia was christened by Miss Hilda Holloway, daughter of William Grace Holloway, vice-president of W. R. Grace & Co.

Ships Sold for Scrapping. — The Shipping Board on October 7, accepted the bid submitted by the Bos-

ton Iron and Metal Company of Baltimore, for the scrapping of 124 vessels upon which bids were received on September 30. The accepted bid was on proposition No. 2 at the price of \$1.51 per gross ton of recoverable material. The contract will include the provision that the right is reserved to withdraw such of the vessels bid for as the Board may elect, with the privilege at the discretion of the Board of substituting other vessels for vessels which may be withdrawn.

This scrapping plan marks a forward step in the efforts of the Board to further reduce the idle tonnage over-hanging the American shipping situation. The idle vessels in the hands of the Shipping Board will be reduced from 265 to 141. In addition, the Board has 100 vessels in active operation spread among the five lines in the hands of managing operators under the lump

sum agreement.

Reconditions Square-Rigger. — The square-rigged ship *Coriolanus*, now being refitted for service by the Bath Iron Works Corporation at Bath, Maine, will be ready to sail from Boston on her first voyage November 12, according to C. Nelson Rogers, president of the West African Trading Company, Inc. The old iron-hulled vessel was rescued from the packet trade and sent to Bath for installation of new masts, new rigging, and re-furnishing quarters.

The probabilities of a fleet of square riggers sailing from North America to Africa in periodic voyages were strengthened when Mr. Rogers secured an option on a second vessel which will be refitted next spring, provided the first voyage of the *Coriolanus* proves the possibilities of square rigger trade.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of October 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,

Foot of 26th Ave., N.W. Seattle, Wn.
Nenana, wooden hull, stern-wheel, river steamer for Alaska Railroad, Dept. of Interior, Bell St. Terminal, Seattle, Wn.; 235 L.O.A.; 210 L.B.P.; 6 ft. depth; 3'6" draft; 2 tan. comp. steam engs.; wood-burning boilers; 100 pass.; 300 tons freight; keel 7/13/32; deliver 5/10/33 est.

THE MOORE DRY DOCK CO. Oakland, Calif.

Hull 182, floating crane for Mare Island Navy Yard, for U. S. Navy, Bureau of Yards and Docks; 100 x 45 x 3'10"; 374 gr. tons; keel 10/32 est.; launch 11/32 est.; deliver Dec./32 est.

Hull 183, floating crane, same as above, for San Diego Operating Base; keel 10/32 est.; launch 11/32 est.; deliver 12/32 est.

U. S. NAVY YARD, Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 10/2/32 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD, Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31; deliver 2/11/34 est.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., LTD., Union Plant.

Drydock, clean, paint, m'sc. repairs: Stmr. Cricket, fish boat San Lucas, Reliance, Olympic, stmr. President Wilson, Chehalis, Edwin Christenson, Manukai, Haviside Barge No. 2, stmr. Monterey, Plume, President Hoover. Repair starboard exhaust manifold: m.s. Athelduke, Mfg. 1 Beth. tailshaft liner: m.s. Brunswick. Renew tubes in boiler, as directed: stmr. Bellingham. Make and furnish boiler furnace, stop valve bonnet: stmr. La Purisima. Reface high pressure piston follower: stmr. Ruth Alexander. Boiler repairs: stmr. Los Angeles. Pipe repair: stmr. Mojave. Two C. I. propeller blades: tug Sea Queen. M'sc. repairs: stmr. Los Angeles, fish boat Standard, stmr. Cathwood, Major Evan Thomas, m.s. Varanger, stmr. Lansing, Point Salinas, Talamanca, Chiriqui, Haviside Barge No. 3, stmr. Antigua, Herbert Schafer, Lubrico, barge Martinez, stmr. Matsonia.

GENERAL ENGINEERING & DRYDOCK CO., Oakland, Calif.

Drydocked and voyage repairs: yacht Zaca, stmr. Columbian. Drydocked: tug Standard No. 1, tug Dispatch No. 3, stmr. Mala, stmr. Tahoe. Main engine repairs: stmr. Robert Luckenbach. Deck repairs: stmr. Columbian. Retubed starboard main boiler, dry-docked and voyage repairs: stmr. Chas. Christenson. Misc. repairs to deck and hull: patrol boat Cygan. Drydocked, retubed starboard boiler, double bottom tanks repairs: stmr. Noyo.

THE MOORE DRY DOCK CO., Oakland, Calif.

Drydocked and m'sc. repairs: stmr. Bordeaux Maru, J. B. Stetson, stmr. Golden

Cloud, stmr. Tamaroa, stmr. Golden Star, stmr. Columbian, stmr. Iowan, Esther Johnson, Bellingham, barge Fruto, stmr. Manoa, stmr. Nelson Traveler, stmr. Panaman, stmr. Wallingford, Santa Fe Barge No. 8, stmr. Golden Poppy, Western Union barge, Patterson.

PRINCE RUPERT DRYDOCK & SHIPYARD

Docked, cleaned, painted, misc. hull and engine repairs: 8 fishing boats. Misc. hull and engine repairs not requiring docking: 24 fishing boats.

U. S. NAVY YARD, Bremerton, Wn.

Repairs and docking: Pennsylvania, Oklahoma, Detroit, Cincinnati. Misc. repairs: Omaha. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS Bath, Maine

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed; keel 11/1/32 est.; deliver 6/11/34 est.

T. B. McIntire, hull 155, quarantine tug for U. S. Public Health Service, Boston; 60 ft. long; 15 ft. beam; 7 ft. depth; keel 7/24/32; launched 10/12/32; delivered 10/19/32.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington,

D.C.; 131 long 24'6" molded beam 8'6" molded draft; 500 H.P. eng; keel 8/20/32.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT, Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement, deliver 2/15/33 est.

Lurline, hull 1447, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/32; deliver Jan '33 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed; deliver 2/11/34 est.

CHARLESTON DRY DOCK & MACHINERY CO., Charleston, S.C.

Wylie L. Moore, all welded river towboat for Pure Oil Co., Chicago, for Savannah River; 240 H.P. Worthington diesel eng; Keck Gonnerman stern wheel drive; keel 7/28/32, launched Oct. '32; deliver 11/1/32 est.

DEFOE BOAT & MOTOR WORKS

Bay City, Michigan

Purchasing Agent: W. E. Whitehouse. Escanaba, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W-T boilers; keel 12/15/31; launch 9/17/32 est; deliver 11/10/32 est.

DRAVO CONTRACTING COMPANY,

Pittsburgh, Pa., and Wilmington, Del. Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hull 1139, steel hull, 20-in. pipe-line, self-propelled, diesel-electric powered dredge for U. S. Engineers Office, St. Louis, Mo. Hull 1140, same as above.

Hull 1141, steel hull deck barge for U. S. Engineers, Washington, D.C.; 80 x 26 x 6 ft.

Hull 1142, same as above.

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self-propelled 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.

Myrtle, lighthouse tender for U. S. Dept. of Commerce, Bureau of Lighthouses; 93x 23x5 ft. 2 Atlas-Imperial diesel engs; launched 9/30/32.

ELECTRIC BOAT CO.,

Groton, Conn.

Cuttlefish, fleet submarine SS171 for U. S. Navy; keel 10/7/31; deliver 12/29/33 est.

Repairs: Drydock, clean, paint, yacht Mascotte, trawler Wild Goose, yawl Adventure, sloop Comet, stmr. Bard. Clean and paint: trawler Brant, trawler Coat. Clean, paint, and put on new false keel schooner Lucia

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent, R. S. Page

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft, 18½ knots loaded speed, 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32; deliver 10/10/32 est.

Santa Paula, hull 122, sister to above, keel 8/4/31; launched 6/11/32

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel

9/28/31; launched 10/3/32.

Santa Elena, hull 124, sister to above; keel 3/24/32.

HOWARD SHIPYARDS & DOCK COMPANY,

Jeffersonville, Ind.

Purchasing Agent: W. H. Dickey

Sergeant Floyd, hull 1700, one inspector boat for U. S. Engineers Office, Kansas City, Mo.; 138 by 30 by 5 ft. keel 3/21/32; launched 5/31/32; delivered 8/5/32.

MARIETTA MANUFACTURING CO., Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.; 132 x 35 x 10 ft.; 8 delivered; deliver balance 8/1/32 est.

Hull 288, steel fuel barge for Campbell Transportation Co., Pittsburgh, Pa.; 110 x 24 x 8 ft. deliver Oct./32 est.

MIDLAND BARGE COMPANY, Midland, Penn.

Huckleberry Finn, tunnel-stern, stern-wheel, diesel-powered towboat for Inland Waterways Corp., Washington, D.C.; 160 by 50 by 8 ft. depth; two 590 B.H.P. McIntosh & Seymour diesel engs.

Tom Sawyer, same as above

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas Plummer, 90 Broad Street, New York City

Colombia, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive, 5200 gr. tons; keel 2/29/32, launched 8/6/32; deliver 12/1/32 est.

Haiti, hull 348, sister to above; keel 4/4/32, launched 9/17/32; deliver 11/15/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept; keel 9/26/31; deliver 5/1/34 est.

Peten, hull 354, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 S.H.P.; keel 3/9/31; launched 8/15/31; Reconditioning; deliver 2/26/33 est.

NEW YORK SHIPBUILDING CO.

Camden, N. J.

Purchasing Agent: J. W. Meeker

Indianapolis, hull 399 light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31; deliver 10/15/32 est.

Washington, hull 406, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines; 30,000 S.H.P. 6 B & W boilers; keel 1/20/31; launched 8/20/32; deliver 5/3/32

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31; launch 9/33 est; deliver 3/3/34 est.

THE PUSEY & JONES CORP.,

Wilmington, Del.

Purchasing Agent: James Bradford. Arbutus, hull 1057, lighthouse tender for

U. S. Department of Commerce, Bureau of Lighthouses; 163'6" L.B.P.; 32 beam; 10'7" molded draft; two triple exp. steam eng.; 2 W.T. boilers; 2000 D.W.T.; working gear; contract signed 7/14/32.

Lila, 367' 10½" long, steel, steel, steel, steel, propelled light house tender for U. S. Dept. of Commerce, Bureau of Lighthouses; 163'6" L.B.P.; 32 beam; 10'7" molded draft; 13 in. spaced twin T.E. steam engines; 870 I.H.P.; 2 water tube boilers; 2500 D.W.T.; contract signed 7/14/32.

SPEDDEN SHIPBUILDING CO.,

Baltimore, Maryland

Purchasing Agent: W. J. Collins

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.; 121'6" L.B.P.; 24'9" beam; 12'9" depth; 550 H.P. Fairbanks-Morse diesel eng; keel 3/15/32; launched 8/16/32; deliver 10/31/32 est.

Joseph Goldberger, hull 273, diesel tug for U. S. Public Health Service, New Orleans, La.; 71 L.B.P.; 16'11" beam; 8' depth; 210 B.H.P. Fairbanks-Morse diesel engs.; completion 250 days; keel 7/20/32

SUN SHIPBUILDING & DRY DOCK COMPANY,

Chester, Penn.

Purchasing Agent: H. W. Scott.

Seatrains New York, hull 146, single-screw steamship for carrying loaded railway cars for Seatrain Lines, Inc., New York and New Orleans; 464'6" beam; 63'6" by 38'3" 15½ knots speed; 8500 D.W.T.; keel 2/24/32; launched 9/14/32; delivered 9/29/32.

Seatrains Havana, hull 147, same as above; keel 2/24/32; launched 9/26/32; delivered 10/5/32.

UNITED DRY DOCKS, INC.

Mariner's Harbor, Staten Island, N.Y.

Purchasing Agent: W. Clute

Evelyn, hull 810, tanker for Matco Service Transp. Co.; 64 L.O.A.; 16 beam; 8 depth; 8 M.P.H. speed; 100 B.H.P. diesel eng; keel 7/25/32; launched 9/3/32; delivered 9/20/32.

Helen, hull 811, oil barge for Matco Service Transp. Co.; 110x30x11 ft. keel 7/25/32; launched 9/14/32; delivered 9/22/32.

Doris, hull 812, same as above; keel 7/25/32; launched 9/19/32; delivered 9/22/32.

Wistaria, hull 813, tender for U. S. Dept. of Commerce, Bureau of Lighthouses; 121'4" L.O.A.; 25 beam; 9 draft; 9½ knots speed; diesel electric drive; 240 S.H.P.; keel 10/11/32 est; launch 1/17/33 est; deliver 2/28/33 est.

U. S. NAVY YARD,

Boston, Mass.

MacDonough, U. S. Torpedo Boat Destroyer D.D. 351 for U. S. Navy; 340 ft. long; 35 knots speed; complete 8/11/34 est.

U. S. NAVY YARD

New York.

New Orleans, light cruiser CA32, for U. S. Navy; 10,000 tons displacement; deliver 6/2/33 est.

Not named U. S. Torpedo Boat Destroyer (D.D. 351) for U. S. Navy; 340 ft. long; 35 knots speed; complete 8/11/34 est.

U. S. NAVY YARD

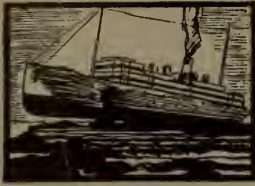
Philadelphia, Pa.

Monterey, light cruiser CA38 for U. S. Navy; 10,000 tons displacement; deliver 10/2/33 est.

U. S. NAVY YARD

Portsmouth, Va.

Cuttlefish, fleet submarine SS170 for U. S. Navy; deliver 9/16/33 est.



Marine Insurance

Fire Proof Passenger Liners

*Underwriters, Naval Architects, and Marine Engineers Cooperating
to Protect Passengers*

IN the recorded fires on ships at sea, in dock, or in shipyards, there has been a decided increase during the past decade as compared with the period before the War. In the years from 1900 to 1915, losses on shipboard due to fire represented approximately 5 per cent of the total marine losses. During the past ten years this ratio has increased to from 8 per cent to 10 per cent of total losses. In other words, the relative frequency of fire as a casual agent in marine losses has increased from 60 to 100 per cent.

This may be explained, of course, in several ways. Tremendous improvement in the safeguarding of navigation undoubtedly has reduced the relative frequency of strandings and collisions as causes of marine loss, and so has assisted in bringing up the frequency ratio of fire.

Improvement in naval architecture and in marine engineering have reduced the frequency ratio of marine losses due to structural weakness and to machinery failure.

However, notwithstanding these statistical explanations and the obvious parallel improvement in fire alarm and fire extinguishing apparatus, the number of disastrous fires at sea and fires on shipboard at builders and repair plants has increased to such an extent as to give considerable concern to marine underwriters.

The Georges Philppar

Notable among recent disasters of this type was the total loss by fire of the French liner Georges Philppar in the Gulf of Aden. This loss of a new, palatial, modern liner on her maiden voyage, accompanied by great loss of life, horrified the maritime world and led to a very searching investigation by the French government and the experts of the marine underwriters involved

and of the classification societies.

This inquiry developed the fact that the internal combustion engines on the Georges Philppar and her use of oil fuel had no bearing on the fire or its cause. The report of the inquiry reviews the history of the use of the diesel engine and of oil fuel at sea, and shows that remarkably few fires can be traced to these sources. The inquiry also gave a clean bill of health to modern electric installations. On the French liners all wires and cables tween decks, in addition to the standard marine insulation, are carried in steel casings or in steel conduit.

All of the evidence on the Georges Philppar and also the supplementary material gathered by the investigators in regard to the causes of other marine fires lead inevitably to the conclusion that the points of greatest fire danger are the passenger accommodations and the refrigeration installations.

The results of this investigation should be of great benefit and should be carefully studied by naval architects, by marine interior decorators, by marine engineers, and by the operations of passenger liners and combination passenger and cargo vessels.

On the modern, first class passenger liner as developed on the Atlantic and Mediterranean seaboard, there has been a tendency toward extremely ornate, overly decorated public rooms and cabins. Much of the material used is highly inflammable. Along with this over-decoration, the striving in competition for "super-luxury" has led to a profusion of fluffy rugs, deep-pile carpets, double and triple drapes,—all easily combustible and great fire spreaders.

American Trends

Fortunately for the American traveling public, this

A Fireman's Fund Marine insurance policy

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HEAD OFFICE

trend has not yet invaded the minds of American designers and American operators. Here the trend in decorating ship interiors is toward the simpler, more fundamental beauties of proportion, line, and color. Some recent American passenger liners have eliminated drapes entirely in the first class cabins and public rooms, and by so doing have given to these rooms a more dignified beauty of line, a simplified color scheme, a cooler feeling in the tropics, and a cleaner atmosphere.

That American practice is alive to the need of fire-proof and fire-resistant materials in public rooms and staterooms might be shown by reference to many of the more recent products of our shipyards and to recent papers read before our technical societies. At the 1931 meeting of The Society of Naval Architects and Marine Engineers at New York, a very interesting paper on "New Structural and Decorative Materials in Ship-building" was presented by William S. Blewett, Jr. This paper recites the American practice in construction of bulkheads and ceilings in passenger accommodations, acknowledges the fire hazard, and suggests some methods of fire-proofing, as follows:

New Fire Proof Materials

"In a passenger ship the quantities of bulkhead ceiling materials used are enormous. Plywoods in thickness of seven-eighths and three-eighths of an inch, either with lumber of built-up cores, constitute the usual construction. The woods used in the cores or laminations are chiefly fir, chestnut, or California pine; while veneers used for painted panels are ordinary birch, poplar, or gum. Panels of this construction accomplish virtually everything for which they are intended; namely, they take a very nice paint finish, are semisound-proof, easily worked, and light in weight, nonconductors of heat, and are a very adaptable material for marine work except for the ease with which they burn. This deficiency has been recognized by manufacturers, and accordingly they have produced panels which, although not fire-proof, are fire-resisting, such panels usually being made up of wooden cores with veneers of sheet metal, asbestos composition, or other such material. The new Export boats were recently so equipped, while the Morro Castle and the Florida have some of their spaces of this construction. Panels of this type give quite some trouble in erecting; special saws are required, holes have to be drilled for nails as well as screws, and, in fact, the erection costs are about 25 per cent more than those for the ordinary variety of plywood panels.

In addition to these fire-resisting materials, there

are the chemically impregnated woods, which in 2 1/8-inch thickness can withstand a temperature as high as 1500 degrees Fahrenheit for a period of one hour before failing. It is claimed that woods so treated lose none of the physical qualities, such as tensile strength, that the increase in weight is about 20 per cent, and that they will take the same finish as untreated wood without any discoloration from the salts. Another usage of these woods is in refrigerating spaces, where dampness from accumulated condensation has to be contended with. They are now being tried out under such conditions and, while not conclusive, the test reports indicate that they are standing up much better than the untreated woods.

Although wood alone or in combination with other materials is by far the most common construction, there are also the metals. Aluminum has been used extensively in government work and will probably become a common material to the merchant ship in the future.

Fire Proof Construction

The construction of public space walls and ceilings is usually furring on steel bulkheads faced with hardwoods or fancy paneling. Now that we have stainless steel and welding, it seems a reasonable construction to omit the furring and paneling and to replace the mild steel bulkheads with a decorative metal, thereby accomplishing a saving in space, a reduction in topside weights, and, above all, a fire-proof construction. Decorators claim that metals, no matter how they are finished, produce a cold appearance, which perhaps is correct; but after a big sea catastrophe from fire, the operator who is able to advertise the passenger quarters of his ship as fire-proof will be more than compensated for placing safety ahead of catering to the whims of the critical public.

Such progress as has been made in fire protection in the marine field may be largely attributed to Steamboat Inspection and Safety of Life at Sea rules which govern the location and construction of bulkheads above the bulkhead deck, but when compared with the progress made by the building trades, particularly in the large cities, it seems as though our advancement is practically negligible. The attitude seems to be to equip to watch and fight fires rather than to protect against them. Whether or not this is the correct policy to pursue remains to be decided by those who operate the ships, but from the builder's viewpoint it seems as though it would be a worth while investment to make sea travel safer by fire-proofing, as far as possible, the two most vulnerable spaces, passenger quarters and refrigerated spaces."

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Diesel Engine Operation

IV. Lubricants

*By H. A. Shawk**Chief Lubricating Engineer, Associated Oil Company*

THE lubrication of diesel engines should not present any difficult problems, but operating conditions, installations, methods of introduction of lubricating oil, temperatures to be encountered over load factors, type of fuel employed, method of oil purification, oil coolers, cleaners, and the type of operating personnel all enter into and change the picture.

This is the reason why Lubrication engineers are called upon to make all recommendations on diesel engines and to stand by during test periods. The diesel engine, if properly designed for the efficient mechanical introduction and distribution of lubricating oils to the cylinder walls and reciprocating parts, will give perfect performance providing the proper recommendation of lubricating oil has been made after a careful study of conditions. The operation of any type of machinery rapidly brings out the weak spots in design, installation, and quality of lubricating oil, therefore a good operating engineer will remedy the deficiencies as rapidly as time and support will permit. Too many operating engineers are anxious to saddle every trouble on the lubricating oil and force the oil company, through

its engineering personnel, to work out their difficulties. Many instances are on record where much money and time have been spent to show up and change structural weakness or poor mechanical design as the cause of effects that had been charged up to failure of lubricating oil.

Engineers must study out remedies and suggestions and diplomatically present them to the operators and must be in possession at all times of many facts with which to back up argument.

The purpose of this chapter will be an attempt to cover briefly and in a broad way the general subject of lubrication with certain suggestions on operation and care.

Diesel lubricants must possess the following general physical properties:

(a) Flash and fire points must be high enough to provide a factor of safety. Any oil which has a fire test of less than 400 degrees Fahrenheit is not considered capable of standing up under cylinder temperatures. On the other hand, oils of extremely high flash and fire are not particularly desirable, due to their well known carbon forming tendencies. The blending of heavy cylinder stocks to obtain high viscosity is responsible for this condition.

(b) Low cold test is very desirable in lubricating oils for diesel engines. In starting up during cold weather, the high cold test oils are far from satisfactory. Great damage can be done to cylinder walls and pistons unless same are immediately supplied with lubrication as soon as they are in motion.

(c) Viscosity is a very vital consideration and it is here that the greatest skill is displayed by the lubrication engineer in making his recommendations.

Selection of the proper viscosity

of oil requires a thorough understanding of what is expected of the oil when it comes up to perform its mission at operating temperatures. Oil engineers often lose sight of this very important factor.

We constantly strive to build up the 210 degrees Fahrenheit and to lower the 100 degrees Fahrenheit viscosity; in other words, to get as flat a viscosity curve as possible. If it were possible to produce a lubricant whose viscosity was not affected by temperature, we would have attained perfection. The old timers in the lubrication field will recall some of the first motor oils, which had a viscosity curve like a cross section of the Depression of 1929-31. Oils which had a factor of safety at operating temperature say 210 degrees Fahrenheit were of such a viscosity at 50 to 60 degrees Fahrenheit that the engines could hardly be turned over. These oils at 32 degrees Fahrenheit or lower were out of the picture.

To-day we have flattened our viscosity curve and the next year or so will see further advances. Following are some of the points to consider when recommending an oil for diesel engine lubrication.

1. Atmospheric temperature.
2. Cooling water efficiency.
3. Oil cooler vs. no cooler.
4. Type and kind of oil filter or cleaner.
5. Centrifuge system.
6. Point of introduction and distribution of lubricant.
7. Full pressure or modified systems.
8. Type and number of piston rings and bleeder holes.
9. Quality of fuel oil.
10. Type and efficiency of fuel nozzles.
11. Setting of fuel injection nozzles.
12. Method of storage and sump tanks.

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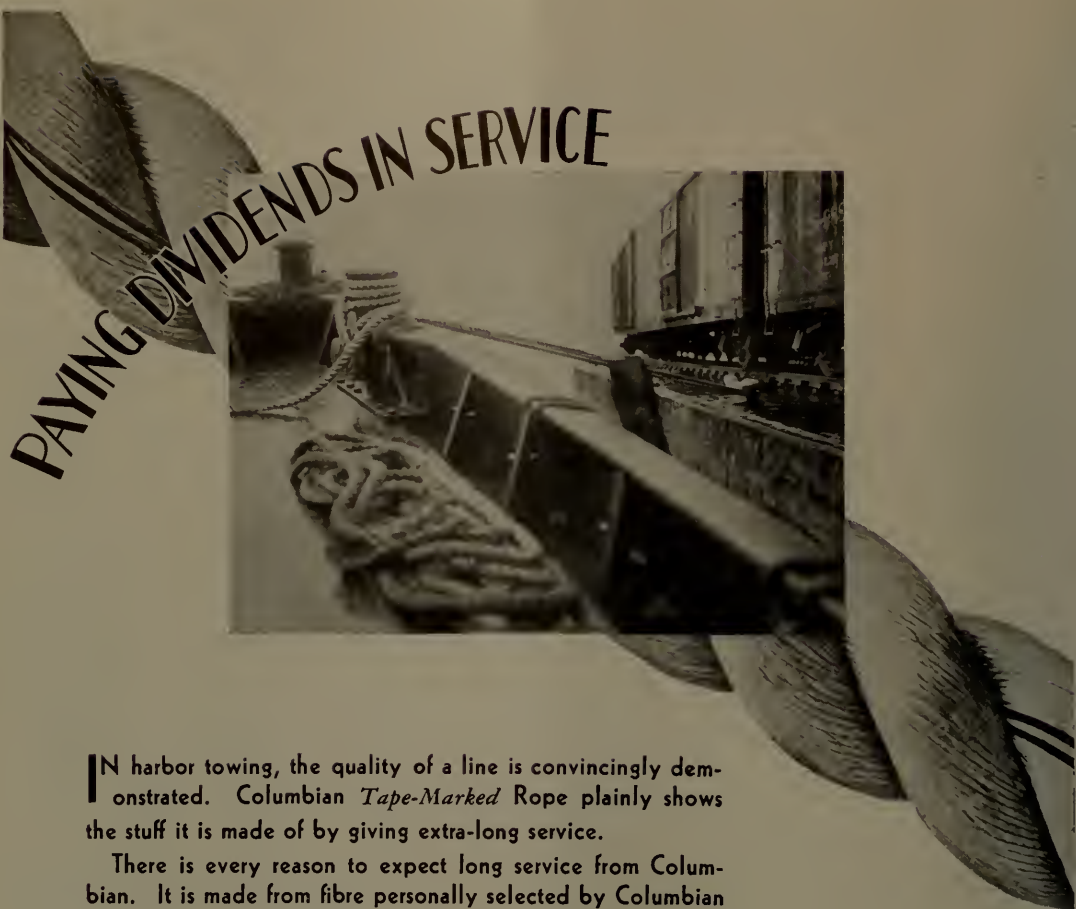
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Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER



"Third time's a charm," says Louis K. Siversen, as he won the Propeller Club golfing tournament for a three-win record.

with a beautiful cup to be played for in all future meets as Perpetual low gross trophy. Russ Pratt delivered a few carefully selected remarks regarding world-wide shipping conditions.

Past president Ralph W. Myers opened his competitive valves, and the boys all cheered him for winning low net in Class "D." His ticket read: 103-26-77.

Prizes were contributed by Bethlehem, General Engineering, Moore's, United Engineering, Plant Rubber & Asbestos Company, E. M. O'Donnell Copper Works, Hercules Equipment & Rubber Company, Associated Oil, Shell Oil, Niderost & Taber, and other awards were made by the Propeller Club.

Here's who won, what and why:



Here's Propeller Golf Chairman G. M. Le Count, who staged the 1932 fall divot diggins in highly acclaimed style.

LOUIS K. Siversen—for the third fall in a trio of years—gets ditto marks under his name on the perpetual "Pacific Marine Review" trophy. At beautiful California Club, Baden, down the peninsula from San Francisco, the 1932 Fall Golfing meet of Propeller Club of California was enthusiastically held on October 6, and Louis Siversen turned in 83-13-70, winning low net.

To B. L. "Tote" Haviside, who once golfed for dear old Leland Stanford, went the hottest round of the 18 hole fracas, his high pressure 81 earning low gross award.

Eighty-two players teed off and all and more got back for dinner. A Scotch mist veiled the vagaries of the links, but each and all enjoyed every minute and swing of the day, whether the putts dropped or not. Chairman C. M. "Dad" Le Count and his golf committee—Russell T. "Prizes" Pratt, Fred P. Ritchie, Vernon Showell, and Thomas B. Forster—staged a gala gathering.

With President James A. Cronin presiding, the fairway navigators played the round over and over again at a banquet board after the afternoon's pencil ordeal. Among the notable guests of the day was Jack Young of Hawaii, who not only depicted a series of Polynesian dance steps, but announced that he is to present the Propeller Club

Class "A"	Low Gross	B. L. Haviside	81
	Low Net	L. K. Siversen	83-13-70
(Also winner low net tournament for Pacific Marine Review Perpetual Trophy)			
Class "B"	Low Net	H. J. Anderson	90-18-72
	Runner-Up	Fred Ritchie	89-15-74
Class "C"	Low Net	Ed. Martin	96-23-73
	Runner-Up	H. T. Haviside	101-23-78
Class "D"	Low Net	Ralph Myers	103-26-77
	Runner-Up	D. Miller	105-26-79
Guest Class "A"	Low Net	G. Jordan	88-18-70
	Runner-Up	Geo. Erlin	85-12-73
Guest Class "B"	Low Net	A. B. Camp	89-16-73
	Runner-Up	Tom Benny	91-18-73
Guest Class "B"	Low Net	S. G. Sherwood	89-19-70
	Runner-Up	Capt. J. J. Casey	92-28-72
		W. S. French	92-19-73

Luncheon Meetings

The weekly get togethers at the Commercial Club have presented most interesting programs which have been nicely diversified.

Oct. 4: Following the events covered in our last review with Charles L. Wheeler, vice-president and general manager of the McCormick Steamship Company, and Commander Abbott of the Naval Reserve as guest speakers, the club was honored on October 4 with a unique program arranged by John S. Gutleben, in charge of Aquatics

for the San Francisco School Department. A series of slides illustrated the work which has been carried on for a number of years in the Bay district. The Sea Scouts has long been a source of fine activity for boys and girls in this district, and the accomplishments of the work of Mr. Gutleben's department were a revelation to the merchant-ship audience. Commissioner Julius Kahn was an honored guest on this occasion.

Oct. 11: Louis A. Stelger entertained with his imitable Chinese characterization. Captain Tom

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Hunter occupied the chair and introduced Captain John A. Rylander, newly-appointed Shipping Commissioner of this district.

Louis Steiger was aided and abetted by Albert Porter, who gave a good account of himself as a "feeder." Chinese anecdotes, interspersed with Cantonese love songs regaled the big audience.

As we go to press, the program committee informs us that events for the next three or four meetings have already been tentatively arranged with the highlight of a distinctive day with Capt. R. W. Hadden bringing us a down-to-the-minute talk on present-day conditions in Russia.

— P C —

NEW MEMBERS—PROPELLER CLUB: Leslie Moody; Captain Frank Johnson, commander of the Yale; Albert T. Fabel, chief engineer of the Yale; and Malcom E. Crossman, executive officer of the California Nautical School.

Addresses Insurance Group. — Captain Stanley E. Allen of the marine department of the Standard Oil Company (Calif.) and secretary-treasurer of the Propeller Club of California, addressed a marine insurance group meeting, sponsored by the Association of Marine Underwriters of San Francisco, on October 10. Captain Allen's topic was "Marine Transportation of Petroleum Products." He dwelt on the constant evolution of design and operations of tanker carriers on the West Coast.

Evers & Hawwers.—Off Monterey on the California Coast, over the October 15th weekend, occurred the annual deep water expedition celebrating the run of swordfish, tuna, and barracuda, with **Frank Evers**, principal surveyor at San Francisco for the American Bureau of Shipping and "Zane Grey of California Street," in the role of big game-fish maestro in the art of the sport. **Hugo Paladini**, Clay street fish tycoon, stood amazed as Frank Evers gave group instruction on landing Barracuda with 12-inch hawser tackle. In the party were **Joe Klein**, marine paymaster of Standard Oil, who in turn illustrated use of a putter for turtle snaring. Joe taps the hardbacks behind the ear. **Hugh Fullerton**, marine harrister, was aboard



Walter L. Dukes, marine manager for Talbot, Bird and Co., and chairman of the Marine Committee of the San Francisco Junior Chamber of Commerce, who worked hand-in-hand with Propeller Club of California for success of Harbor Day bay activities.



"Evolution of West Coast Tanker Design and Operation" was discussed by Captain Stanley Allen at Marine Meeting at San Francisco.



Frank Evers showed Hugo Paladini (above) how to land barracuda with 12 inch hawser. Hugo fishing on his lay off was decidedly amazed, if not confused.

with bulging brief-case carrying all treaty papers involving agreements on subject of international fishing. Perrin Trivitt, marine auditor, carefully checked the weight

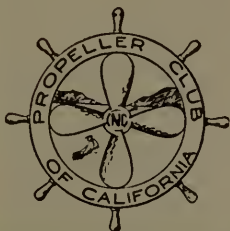
and over all dimensions of each catch. Kenneth Ingraham, of S. O.'s personnel division, coordinated the crew on arrival and departure, thus rendering assurance that none was lost off the Monterey banks. Captain Stanley (Southeast) Allen kept vigil o'er possible S.E. gales, so none appeared. General W. A. Vickery, port steward of Standard Oil at San Francisco, who fed monkey-meat and goldfish to hosts of A.E.F. troops at Bordeaux, was chef de cuisine of the annual outing, paying particular attention to barbecued steaks at shoreside interval. Captain J. A. Rumsey, port captain of Standard Oil, Richmond, laid the courses and made positive no banks other than fish banks were encountered. Captain Rumsey also inspected the hull and checked the cargoes with due precaution. **Ben Bernard Hedstrom**, bay region naval architect, put in an active time with center of gravity, his main concern being proper stowage of the catch to maintain trim.

Santa Rosa Personnel. — C. C. Mallory, vice-president and general manager of the Grace Line, announced the following deck and engine room officers to be in charge of important berths aboard the new \$5,000,000 liner Santa Rosa, first of the fleet of four sister ships, to be assigned to the inter-coastal passenger and freight service by way of the Panama Canal and west coast ports in Central America and Mexico.

Captain Curt Zastrow, formerly skipper of the Santa Elisa, commander; George Dow, formerly first officer of the same ship, chief officer; H. P. Stevens, formerly first assistant engineer on the Santa Cecilia under Chief Engineer Joseph Fitzgerald, to the same position on the new liner; William W. Bowers, formerly chief engineer of the Santa Teresa, who has been shore-side at the plant of the Federal Shipbuilding & Dry Dock Company studying the new engine, to be chief of the propulsion department of the Santa Rosa. James T. Sager, chief steward of the Santa Ana to the same berth on the Santa Rosa. Joseph W. Scheuch to be purser. He served in the same capacity on the liner Santa Elisa.

The Santa Rosa sails from Philadelphia November 23, New York, November 26, and is scheduled to enter the Golden Gate on her maiden voyage December 14.

Official News of the PROPELLER CLUB of California



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THIS year's Harbor Day at San Francisco, celebrated on September 28, goes down in chronicle of our glorious port as the most interesting and colorful of all such events. The wide range of the program vigorously awakened the people of San Francisco to the tradition, importance, and need of the mighty harbor about which moves commercial and business progress of all the bay-bordering communities.

To the Propeller Club of California was given the management of the racing regatta off the Marina under sponsorship of the up-and-coming San Francisco Junior Chamber of Commerce. This series of races lined the shore with 50,000 spectators throughout the successful day.

To the Propeller Club's Harbor Day Race Committee—Captain A. T. Hunter, chairman; H. T. Haviside, Vernon Showell, Captain J. A.



Captain A. T. Hunter, chairman of the Propeller Club of California's Harbor Day Boat Race Committee: Unceasing effort put over a memorable program.

Rumsey, and Captain Stanley E. Allen — go hearty congratulations for shipshape conduct of the rowing contests.

Base of operations was the mighty Haviside derrick barge No. 4, anchored off the thronged Marina shore. The No. 4 was the finish point for the races. Executives of scores of shipping lines, who were acting as officials for the oar contests were aboard the barge and each and all enjoyed the day, not only viewing the racing, but participating in the Marine Parade along the far-flung pierhead row. We had ringside view of the merchantmen, schoolship, cutter, and fish boat competitions.

Luncheon was served aboard the giant barge, enjoyed by all the racing crews and officials of the day, who so generously gave their time to take hand in the day's success. Through courtesy of Henry Bostwick, manager of the P.G.&E., their



President James A. Cronin of the Propeller Club of California, on behalf of the San Francisco Junior Chamber of Commerce, presenting the Bethlehem Shipbuilding Corporation, Ltd., trophy to the winning crew of American - Hawaiian Steanship Co. steamer Nebraskan. Front row, left to right: L. S. Myers, A. Anderson, C. Halmstrom, Coxswain E. E. Johnson, James A. Cronin. Rear row: R. Loring, P. A. Schmidt, T. C. Nordlie, T. Kramer, H. Johannsen.



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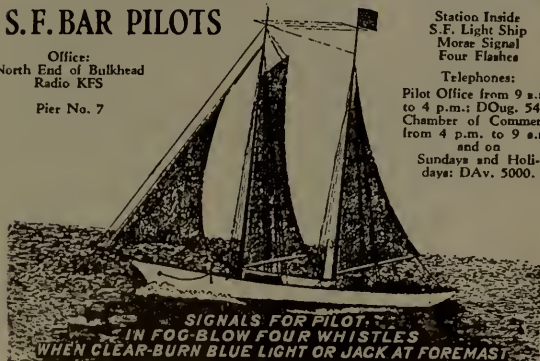


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Trade Literature

Gas Electric Sets for Every Application is the title of an illustrated 8 page publication recently issued by the Westinghouse Electric and Manufacturing Company. The sets are designed for furnishing continuous or auxiliary power supply for construction camps, barges, dredges, oil and gas wells, excavating operations, wharves, docks, loading platforms, ships, lumber camps, mines, quarries, radio stations, sign boards, traveling shows, theatres, schools, hotels, airports, airways, and steam railroads. They are also suitable for all kinds of emergency service. The publication describes and illustrates each set, listing its mechanical features, ignition, and control.



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Before me, a Notary Public in and for the State and County aforesaid, personally appeared Bernard N. DeRoche, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Jas. S. Hines, 510 Sansome Street, San Francisco, Calif.

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Business Manager: Bernard N. DeRoche, 737 Central Coast Avenue, Berkeley, Calif.

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BERNARD N. DEROCHE.

Sworn to and subscribed before me this 24th day of September, 1932.

EDITH GOEWEY

Notary Public, in and for the City and County of San Francisco, State of California.

(My commission expires November 22, 1932)

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Pacific Marine Review

DECEMBER, 1932



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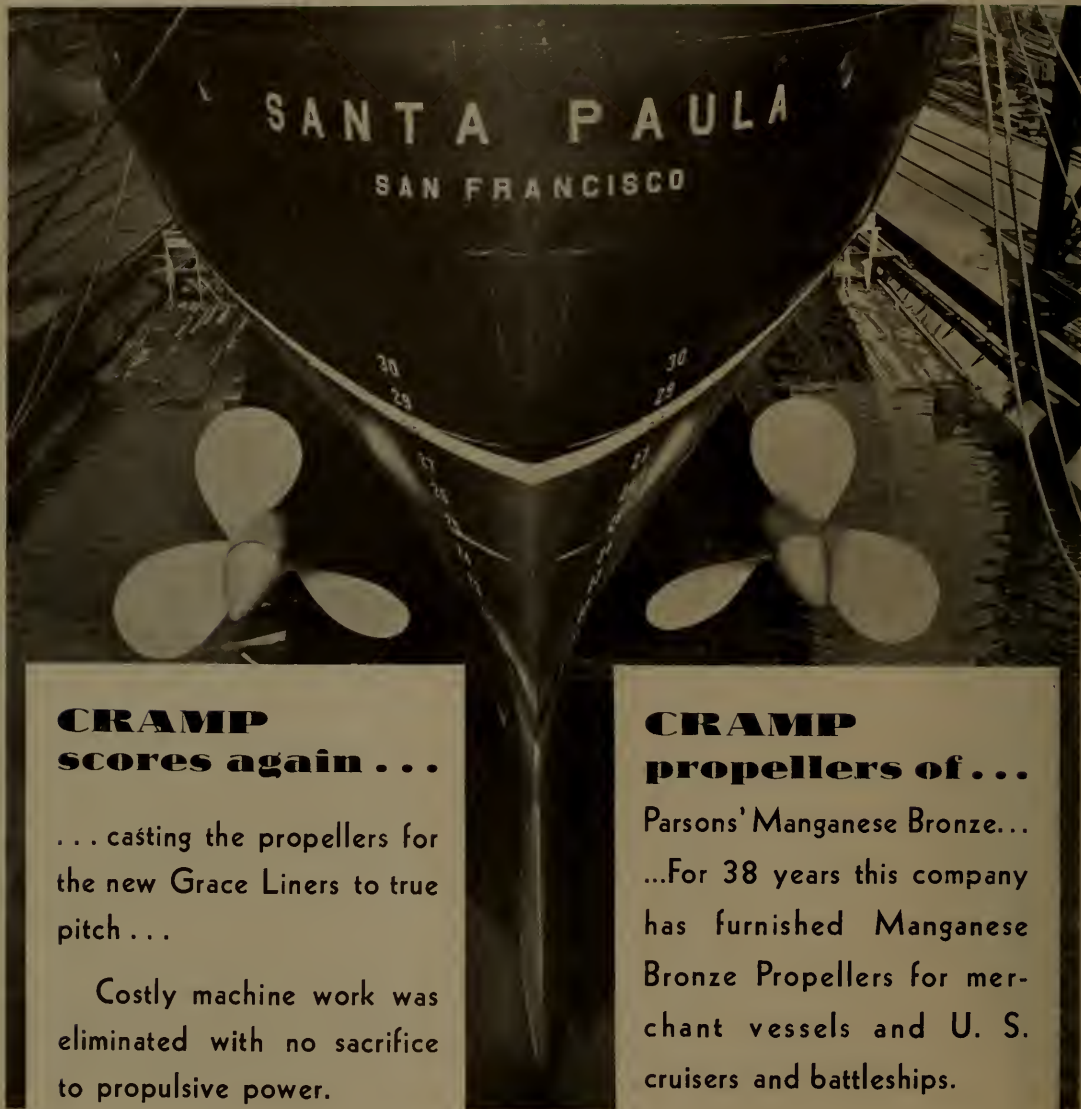
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The National Magazine of Shipping

NUMBER 12

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Chas. F. A. Mann, Northwood, Rochester, 118 East Second Street, Bldg. Three, W. 10-1014

Of 40 Ships Now Building Abroad....

In Sizes from 6,000 to 20,000 Gross Tons
(Lloyd's Report, September 30, 1932)

38, 95%, - all but 2, - ARE DIESEL SHIPS



Country	Steamships	Diesel Ships
Great Britain - - -	2	3
Germany - - -	0	6
Sweden - - -	0	9
Holland - - -	0	4
Denmark - - -	0	1
Norway - - -	0	1
France - - -	0	2
Spain - - -	0	2
Italy - - -	0	5
Japan - - -	0	5
Total - - -	2	38
UNITED STATES -	8	0

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San Francisco
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Pacific Marine Review

VOLUME XXIX

DECEMBER, 1932

NUMBER 12

Four New Grace Liners

New Intercoastal Liner Santa Rosa, First of Four Sisters, Presents Some Novel Features in Passenger Accommodations and a World's Record in Fuel Economy

TO ALL Californians, the advent of the Steamship Santa Rosa in the Panama Mail intercoastal service of the Grace Steamship Company has peculiar interest and meaning. Grace Brothers were pioneers in the intercoastal sailing ship services round the Horn from New York to San Francisco. Panama Mail is the successor to Pacific Mail, pioneer steamship operators from New York to San Francisco.

Before the days of the transcontinental railway, white-winged Grace Line clippers were making 100-day voyages to carry Atlantic products to the new markets created by the Gold Rush in California and bringing back to Eastern markets the produce of the new state. Pacific Mail is a real Forty Niner; passenger steamers of that line having established connections between New York and San Francisco via the Isthmus of Panama before California was admitted to statehood.

So, in welcoming the Steamship Santa Rosa and her three sisters, Santa Paula, Santa Lucia, and Santa Elena, the City of San Francisco will be remembering the glamorous old pioneer times when "Steamer Day" was the great day of the calendar, a day of reunions and rejoicings, of partings and heartbreaks, a day when the whole city was on the Embarcadero and every man, woman, and child had some personal interest in the passenger list, the mail bags, the strong box, or the cargo manifest of those old side-wheelers.

Looking back to those grand old days, San Francisco may well be proud of her growth. The difference between the city then and now might be measured quite accurately by the improvement in port facilities, the increase in water-borne commerce, and the growth in size and speed of the vessels serving the port.

Pacific Mail or Panama Mail ships have served the port of San Francisco for over eighty years. Grace ships have served San Francisco for over sixty years. San Francisco is the Pacific headquarters for the combined fleets of Grace Steamship Company, including the Panama Mail Service, Santa Rosa, Santa Lucia, Santa Paula, and Santa Elena—four beautiful sisters—are doubly welcome to their Pacific Coast home port. Welcome for their own beauty, grace, and power as modern vehicles of ocean transport. Welcome for the many associations that cling to the names of their owners and operators and that are entwined round the very heart of old San Francisco.

New Grace Service

S. S. Santa Rosa, the first of four sisters, is now on

her maiden voyage from New York to San Francisco, scheduled to arrive at the latter port on Wednesday, December 14 at 7 a.m. She will be followed by the S.S. Santa Paula, arriving San Francisco on January 24, 1933; S.S. Santa Lucia, arriving March 7; and S.S. Santa Elena, arriving April 15.

These vessels form the new intercoastal fleet of the Grace Steamship Company. The new Grace liners were designed by and built under the supervision of Gibbs & Cox, Inc., who had as consultants in connection with the joiner work the office of John Russell Pope; and on interior decoration, Elsie Cobb Wilson, Inc. The vessels were built by the Federal Shipbuilding & Drydock Company in Kearny, New Jersey.

With this expansion of fleet will come an equally important expansion of service on the Pacific Coast end of the run. The four new steamers will establish an extension of the line to serve Seattle and Victoria as well as San Francisco and Los Angeles. This service will operate twice monthly between Seattle and New York, calling at Victoria, San Francisco, Los Angeles; Mazatlan; San Jose de Guatemala; La Libertad, El Salvador; Punta Arenas, Costa Rica; Balboa; Cristobal; Puerto Colombia, Colombia; and Havana. This schedule will be made in 22 days from Seattle to New York and in 21 days from New York to Seattle.

Santa Rosa and her sisters have the following general characteristics:

Length over-all	508' 0"
Length between perpendiculars	484' 0"
Beam molded	72' 0"
Depth molded to B deck	38' 11"
Loaded draft	26' 2"
Displacement, tons	16,500
Cargo hold capacity, cubic feet	250,000
Refrigerator hold capacity, cubic feet	42,000
Passengers, First Class	225
Passengers, Third Class	65
Steam pressure, throttle, pounds	375
Steam temperature, total, Deg. Fahr.	750
Normal horsepower	12,500
Propellers	2
Propeller R. P. M.	95

From long experience in the requirements of the route the vessels are to service, the officials of the Grace Steamship Company and of the Panama Mail Line had acquired some very definite ideas of the desirable features in size, draft, speed, passenger accommodation, and cargo facilities that would be recom-

cially advisable as factors in the design of new ships.

Extensive model experiments were carried out to get the hull lines, hull appendages, and propellers for best propulsive efficiency. Much investigation produced the best design of steam generator, the most economical turbine, and the most efficient condenser and feed water system. As a result of all this planning, when pronounced ready for sea trials, with her bottom and sides covered with International Antifouling and International Boot-Topping, the Santa Rosa easily made 20.05 knots to cover her guarantee of 18.5 knots, and set up a new mark for fuel consumption at 0.558 pound per horsepower hour.

Chief among these new features is the location of the dining saloon and galleys, the former on the promenade deck, the latter on the boat deck above. This main dining room is a spacious apartment with two-deck height, its center covered with a fine skylight so designed that it can be opened in fair weather. The galley on the boat deck serves this room via a broad, easy stairway to serving pantries on the promenade deck. This arrangement should prove very acceptable to passengers, especially in the tropics, as it will make for better ventilation in the dining room and eliminate all galley odors from passenger accommodations.

Hull Arrangement

The hull of these vessels may be described as a flush deck ship with complete superstructure and having a combined bridge and forecastle extending over four-fifths of the vessel's length from the stem. There are eight steel decks including the house-top. A cellular double bottom with floors on every frame is fitted from the forepeak bulkhead to the after peak bulkhead and extends outboard with the margin forming a "Convention" protection in way of the bilges. There are three cargo holds forward of the boiler room, a group of fuel oil storage tanks between the boiler room and engine room, and three cargo holds aft of the engine room together with fuel oil tanks outboard of the shaft alleys and fresh water tanks between the shaft alleys aft of the forward cargo space.

There are nine double bottom tanks in addition to the fore and aft peak tanks and all these may be used for the storage of fresh water or ballast, with the exception of the double bottoms under the fuel oil tanks between the engine and boiler rooms, which are arranged as fuel oil storage tanks and are separated forward and aft from the adjacent tanks by cofferdams.

The ten transverse water-tight bulkheads all extend to B deck, which is the bulkhead deck, with the exception of the forepeak bulkhead which extends one deck higher, that is, to A deck. These bulkheads subdivide the ship into eleven water-tight compartments and the ship is so arranged that it will remain afloat with any two adjacent compartments completely flooded. Where it has been necessary to pierce these water-tight bulkheads, American Locomotive Company-Stone System power-operated water-tight doors are provided which may be worked either locally or from the bridge, with a tell-tale indicator to show the position of all doors.

Promenade Deck

Accommodations for the deck officers are located at the forward end of the boat deck, aft of the wheel house. The captain's quarters include the chart room, day cabin, bedroom and bath. On the port side are separate rooms for first, second, third, and fourth officers, chief electrician, two junior electricians, and two purser's clerks. On the starboard side are the captain's rooms, radio room, stateroom for two radio operators, and rooms for six junior engineers.

The after end of this space is occupied by the movie booth from which pictures are projected into the dining room.

The space between the two stacks is taken up by the dining room which extends from the promenade deck up to a domed structure extending somewhat above the top of the boat deck house, thus providing a considerable height for this room. The roof of this structure is provided with two sliding parts so that in good weather the roof may be opened. In combination with the large casement windows on the sides, this feature practically converts the dining room into an open air space.

Aft the after stack are located the various pantries and galley and also accommodations for the chief engineer, four assistant engineers, and the deck officers and engineer officers' messroom.

On the promenade deck are located the living room which is forward, the dining rooms, library, grille, club and palm courts.

Bridge Deck

The bridge, or A, deck, as will be seen from the plan, is given up almost entirely to passenger accommodations. The purser's office is conveniently located forward amidships, facing the stairway coming down from the promenade deck. The midship section in this deck is taken by uptake spaces, lavatories, trunk room, photographic dark room, and aft by a novelty shop and gymnasium. Outboard on the port side there is a barber shop and beauty salon.

On each side of this section is a wide passageway extending the full length of the deck, these passageways giving access to the passenger accommodations. These accommodations consist of 41 outside rooms, every room being fitted with bathroom containing either a shower or tub, or a combination of shower and tub with lavatory and toilet facilities. Of these rooms, 14 are single, the remainder are double or are arranged in suites. In addition, some of the single rooms can be made into double rooms by means of communicating doors.

The remainder of this deck at the after end is a sports deck with a large tiled open air swimming pool in the center, 20 by 35 feet. This pool is arranged in two depths, five feet and seven feet, and is fitted with submerged lights for night use. This sports deck with its swimming pool and the verandah club on the deck just above will form one of the most interesting outdoor features of life on the ship.

B Deck

B Deck, located just below A Deck, also is given over almost entirely to passenger accommodations, as will be seen from the plan. Access to this deck is had by staircases forward and aft.

A section on the centerline of the ship is utilized by the uptake spaces, lavatories, deck pantry, and five inside rooms. All of the other rooms are located outside of the fore and aft passageways and are outside rooms with wardrobes and bathrooms. Some of these rooms are arranged with doors to form double rooms if desired and most of them are fitted with a Pullman berth that folds up into the ceiling and is completely out of sight when not in use.

On the after portion of B Deck aft the cargo hatch is a deckhouse containing six rooms for third class passengers. These rooms are arranged to accommodate either four or six passengers each. Directly below this space and extending aft is an open compartment arranged to accommodate a total of 36 male third class passengers.



Eighty Years of Progress in Pacific Merchant Shipping

WELCOME, SANTA ROSA, TO YOUR HOME PORT!

The pictures on this page represent eighty years of progress in Pacific Ocean Transportation.

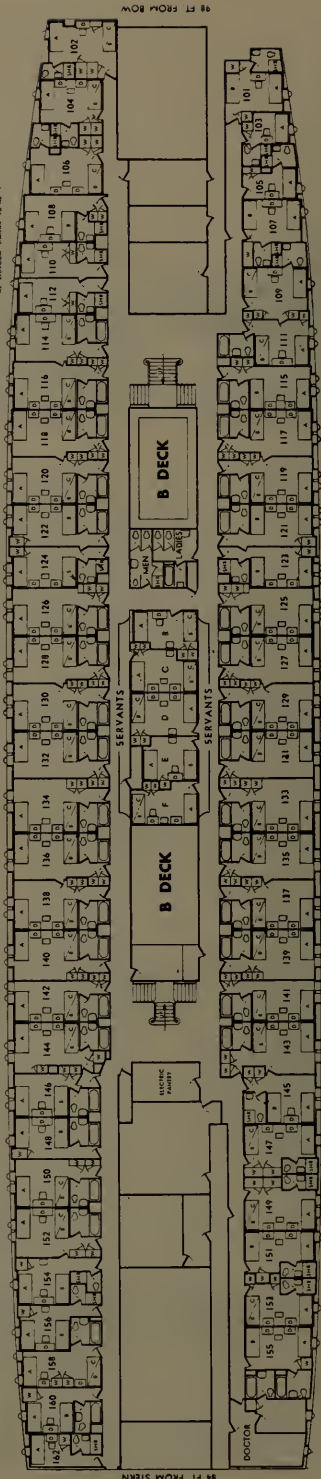
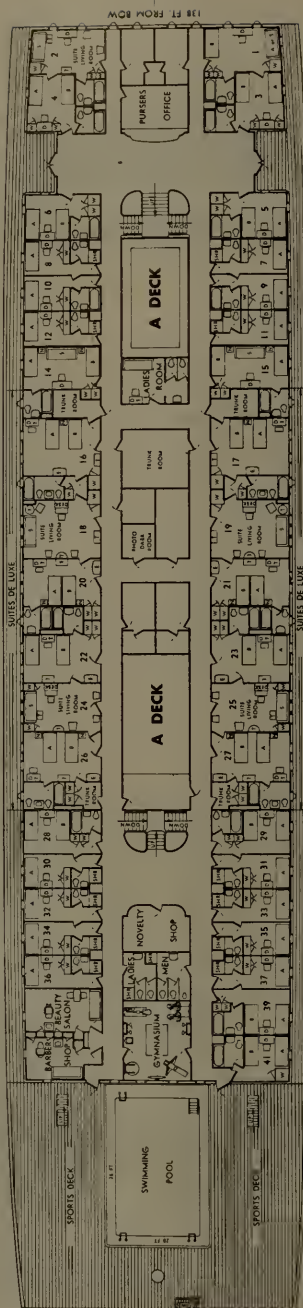
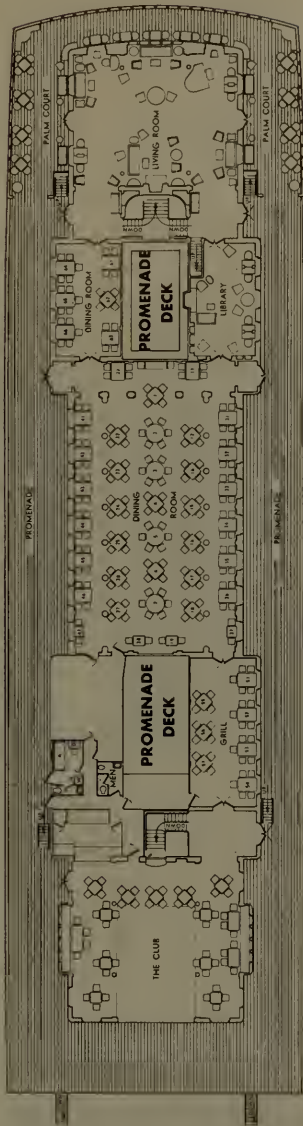
Above, we have the old Pacific Mail side-wheel steamer Oregon arriving in San Francisco, October 25, 1850, bringing from Washington the news of the admission of California to Statehood.

At the right is a reproduction of Charles R. Patterson's spirited picture of the M. P. Grace, a full-rigged "Down East" sailing vessel built by the Grace Line for New York-San Francisco service around the Horn in the Seventies.

Below is shown a view of the new Steamship Santa Rosa, steaming 20 knots on her trial trip. This palatial vessel, with her three sisters, will make New York from San Francisco on a 17-day schedule, calling at a number of Latin American ports en route. Eighty years ago 100 days was good time by water between these two ports.



(The above and below pictures are the property of the Grace Line, New York)



Plan of first class passenger accommodations on the new Grace Liners. Every stateroom is an outside room and is equipped with either tub or shower bath. Note the location of the dining room on the promenade deck.

Accommodations on New Grace Liners

THE Grace Line's four latest contributions to the American merchant marine are the first American ships having all outside rooms with private baths. Their most striking characteristics are the luxuriously home-like atmosphere that pervades every room and the genuine American spirit that prevails throughout.

The four new Grace liners have been designed and decorated with the idea that the greater part of each voyage will be made over tropical waters. Public rooms have been brought "up top" where there is ample light and air; decks made broad and with as few obstructions as possible; colors and materials used that are cool and "summery."

Living Room. Touring around the promenade deck of the Santa Rosa, one finds the forward part of the deck enclosed with Kearfott frameless sliding glass windows to form palm courts which give entrance to the living room. Pale green latticed-ceiling and walls, growing plants, and attractive wicker furniture with blue slipcovers, give the effect of a conservatory surrounding the living room.

This living room is a spacious yet very home-like



The living room is a spacious apartment in the Georgian style with large casement windows and doors opening on three sides into the palm courts formed by the enclosed portion of the promenade deck.



One of the many graceful stairways on the Steamship Santa Rosa.

room artistically decorated and finished in Georgian style. Surrounded on three sides by the palm courts, it is one of the lightest, most airy rooms on the ship. When the swinging doors and the tall French Kearfott casement windows reaching down to the deck are open, the room virtually is part of the palm courts and in the tropics can be completely thrown open to the breezes.

This living room is finished in white with beautifully carved mouldings and fluted columns that are in keeping with the Georgian style and is furnished with Eighteenth Century English reproductions developed in mahogany and walnut. Graceful desks stand near the windows; grouped near the grand piano are small tables with lamps made from antique vases, and chairs upholstered in yellow leather or in cool-looking blue green and white chintz. Comfortable davenports and coffee tables are centered around the large open fireplace.

Library. Aft of the living room on the starboard side is the library, a restful room paneled from floor to ceiling in natural pine. Bookcases have been built into the wall on either side of the fireplace. The color scheme—blue green, and soft yellow—is introduced by bright chintz curtains, chairs upholstered in leather, and old Currier & Ives prints that hang above the bookcases.

Main Dining Room. The main dining room, two decks high at either side and almost three decks high in the center, is entered from the promenade deck and, being "topside," is particularly well lighted. A specially constructed dome that rolls back and tall Kearfott casement windows can transform the room into a breeze-swept outdoor cafe. This dining room is finished in soft Adam green with columns and pilasters in a darker shade. The chief decorative feature is a beautiful mural painting—15 feet high and 8 feet wide—by the noted marine artist Charles R. Patterson of the old full-rigged "Down East" sailing vessel M. P. Grace, raised for the brother of the founder of W. R. Grace & Co.

A silver service worthy of this splendid room was furnished by Reed and Barton of San Francisco; and the glassware, chinaware, and Westinghouse Micarta trays for table service were supplied by the Dorhmann Hotel Supply Company of San Francisco. Syllent-Tex table pads insure quiet service and increase the wearing life of table linen and table ware.

From the orchestra balcony at the opposite end of the dining room, sound motion pictures will be projected to a large screen which can quickly be set up in front of the mural painting.

Grill and Private Dining Room. Aft of the main dining room on the starboard side and forward of it on the port side are two smaller dining rooms—the grill and a private dining room used for children. These rooms are finished in pale green and white, have large mirrors that almost cover one wall, and are attractively furnished with chairs copied from Hepplewhite like those in the main dining room.

The Club and Verandah. A casino-like club—rendezvous for bridge, dancing, and refreshment—opens on the after deck. The walls are broken by casement windows with blue-cushioned seats underneath, by panels painted with tropical birds and foliage, and by large mirrors reflecting the flowering plants growing from floor boxes.

Tables and wicker chairs, cushioned in dull blue, edge a large hardwood dance floor so constructed that it is absolutely smooth. At one end of the room is the service counter and at the opposite end a broad canopied verandah overlooking the sports deck and swimming pool. The large sliding doors opening on the verandah may be thrown back, converting the club into an outdoor cafe.

A spacious outdoor promenade surrounds the public rooms aft of the palm courts on this deck. This space is liberally provided with the famous Readsboro deck chair, insuring comfort for the fresh air enthusiasts.

Swimming Pool. The built-in swimming pool, located on the deck below, is the largest open-air pool on any American ship. Green tile gives color to the water and



umbrella-topped tables and colorful chairs lend a beach-like atmosphere. The pool has a continuous flow of salt water drawn from the ocean and may be illuminated at night. Fresh water showers are conveniently near. The sports decks surrounding the pool are unusually broad and unobstructed.

Near the pool is the gymnasium, a large room equip-



Upper view shows the after end of A Deck, looking forward, featuring the large outdoor swimming pool and the outdoor verandah cafe on the promenade deck above.

Center shows the beautiful library, finished in natural pine.

At left is the grand dining hall with two-deck height over the full room and domed skylight effect giving additional height in the center.

ped with rowing machines, pulleys, electric horses, punching bag, and all sorts of up-to-date "gym" paraphernalia for keeping one fit.

A modernly equipped and expertly staffed beauty parlor and barber shop and a novelty shop stocked with the odds and ends one needs on ship board are nearby.

Deluxe Suites. There are several de Luxe suites each with its color scheme—blue, green, gray or white. Sitting rooms are large and uncrowded—furnished with mahogany reproductions of the Eighteenth Century English period, and with black and gold copies of French chairs. A writing desk, chairs upholstered in chintz or silk, a sofa that may be converted into a bed, graceful small tables, conveniently arranged lights, a telephone, and a radio loudspeaker provide all the comforts of home.

The suite bedrooms are provided with twin Simmons beds, attractive dressing tables, and chests of drawers, colorful chintz chairs, a bed table with telephone and lamp, and—between the chintz curtained windows—a full-length triple mirror. Beautifully tiled bathrooms follow the color scheme of the suite.

Staterooms. There is a variety of single and double staterooms—a telephone in every room—furnished in Eighteenth Century English style with chests of drawers, real Simmons beds with Beautyrest mattresses, conveniently placed lights, electric fans, full length mirrors, and comfortable chintz covered chairs, so arranged that the rooms seem unusually large. Colorful window drapes and chintz bed coverlets give the staterooms the appearance of a living room. Private bathrooms are beautifully modern and well lighted.

With the exception of staterooms and living room, these spaces all have rubber flooring. In the public rooms this is in rich dark harmonious color blendings which accentuate the "cool summery" color schemes of walls, hangings, furnishings, and ceilings. On the floors of passageways the tiling is in soft green shades with black border. The rubber flooring is laid on steel trowelled hard magnesite and is finished with molded rubber core base, molded rubber pintles, and molded rubber door saddles. On two of the four ships the United States Rubber Company installed their Royalite architectural rubber flooring. The other two ships were floored by the Goodyear Rubber Co.

Windows

An unusual amount of daylight in the public spaces has been obtained by a liberal use of casement windows and doors which are most successfully blended into



Upper: Standard stateroom featuring Simmons beds fitted with Beautyrest mattresses.

Center: A bedroom in one of the suites de Luxe.

Lower: The sitting room of the suite.

At the left: A view of the spacious promenade deck featuring Royalite deck chairs.



One of the novel features of the public room spaces on the new Grace Liners is the palm court effect, shown here, which surrounds the living room at the forward end of the promenade deck. This portion of the promenade deck is completely enclosed with sliding, frameless, plate-glass windows and the living room opens into this nicely finished verandah through large casement windows and French doors. All of the windows are by Kearfott.



the decorative schemes and which harmonize perfectly in shape and size of glass pane. The problem of the external appearance of such openings has also been very satisfactorily met. The double casement windows are peculiar in that there is no meeting bar between the sash and therefore the entire opening is unobstructed when the windows are swung open.

The deck staterooms are equipped with mechanically operated fully-housing sliding windows of $\frac{1}{2}$ -inch plate glass of liberal area. The window design prevents rattling and offers excellent protection from wind and weather.

Forty-four $\frac{3}{4}$ -inch thick sliding windows enclose the promenade deck forward, the installation being such that an opportunity was given to attractively finish this space.

All casement windows, doors, stateroom and promenade deck enclosure windows were supplied by the Kearfott Engineering Company.

Galley Equipment

As previously noted, the first class galley and pantries are located on the after part of the boat deck and are completely equipped with all modern labor and time saving devices that are applicable for shipboard use and, in addition, the location of the different parts has been so worked out as to produce a steady flow of materials through the galley and reduce, so far as possible, any unnecessary movements of cooks and assistants in the preparation of meals.

In addition to sinks, serving counters, pan racks, and dressers, there are in the galley three Edison Electric Appliance Company electric hotel ranges, one electric broiler with warming compartment, one large steam-jacketed stock pot, one three-compartment vegetable steamer, one two-compartment refrigerator, a motor driven mixer, and a De Laval motor driven milk emulsor.

Refrigerating machinery is Brunswick-Kroeschell.



The galley and pantry on the new Grace liners should certainly gladden the heart of the sea-going chef and his assistants, since they are located on the boat deck with abundance of natural light and ventilation and are equipped with all of the most up-to-date devices for electrical and steam cooking and for the preparation of food.

Power Plants of Grace Liners

A New Fuel Economy Record

FROM the standpoint of coordinated and modern engineering practice, the main and auxiliary power plants of the new Grace Liners are of the most advanced design and combine all of these elements which tend to produce a high over-all efficiency, such as high pressure, high temperature steam, high vacuum, complete auxiliary electrification, and feed water heating by the series extraction method. The propulsion plants on these ships not only exceed all former standards of economy, but also operate without vibration, noise, or smoke.

Skillful planning of the engine room has allowed the use of exceptionally rugged propulsion turbines and gears, together with truly massive foundations, achieving a rigidity far in excess of ordinary marine practice.

Preliminary data from the official sea trials of the S.S. Santa Rosa indicate a fuel consumption of 0.607 pound of 19000 B.T.U. fuel oil per shaft horsepower hour. Referred to the total horsepower developed by the main turbines, which includes that used in driving the two main turbine-connected 500-kilowatt electric generators, this fuel consumption figure is reduced to 0.558 pound of fuel oil per horsepower at sea for all purposes. This latter figure would make the S.S. Santa Rosa the most economical steamer afloat so far as specific fuel consumption is concerned.

The main propelling plant on each ship consists of two double reduction gear turbine sets of the General-Electric type, each rated 6000 shaft horsepower normal, and 6600 shaft horsepower maximum, at a propeller



The shaft alley of the Santa Rosa.

speed of 95 and 98 revolutions per minute, respectively. The reversing elements which are incorporated in each low pressure casing are designed to deliver 80 per cent of normal ahead torque. The steam conditions at the turbine throttle are 375 pounds gauge pressure and 300 degrees Fahrenheit superheat. The condensers, which are of the Ingersoll-Rand under-slung type, are designed to give 28.25 inches of vacuum with 75 degrees Fahrenheit sea water when operating at normal full power.

The turbines are divided into a high pressure element, which revolves at 4500 revolutions per minute, and a low pressure element, which revolves at 3500



Two views in the engine room of the Santa Rosa featuring one of the General-Electric double-reduction geared, cross compound, main propulsion turbines.



An end of one of the Ingersoll-Rand main propulsion unit condensers on the Santa Rosa. Note the extremely massive foundation of the main turbine and gear and the roller and track arrangement for handling this condenser head when getting at the tubes.

revolutions per minute. The casings are split at the horizontal joint for lifting the upper halves, and blanking and emergency connections are provided so that either element can be operated singly should this be found necessary. The turbine casings are of cast steel and all turbine rotors are milled out of solid steel forgings with the wheels integral with the shaft. Four hand valves are provided for varying the first stage nozzle area, thus reducing the throttling losses to a minimum over wide power ranges and effecting a very flat water rate curve. Three extraction openings are provided in the turbines for the following purposes; one, for the evaporator; two, for the second stage feed water heater, fresh water heating, and steam heating; and, three, for the first stage feed heater.

The propeller thrust bearings built into the forward end of the main gear case are of Kingsbury design and manufacture. They are of the 6-shoe self-aligning equalizing type. Formation of wedge-shaped oil films under thrust load is accomplished by dividing the bear-

ing elements into segments so supported and pivoted that they are free to tilt slightly, assuming automatically whatever taper is required by speed, load, and oil viscosity.

The low pressure element of each main propulsion unit is designed for the additional power capacity required to drive a 500-kilowatt direct-current auxiliary generator from an extension of the low speed pinion. Under normal steaming conditions and at speeds of from 70 to 100 per cent, these auxiliary generators furnish all of the auxiliary power. Each unit delivers its power to a separate bus. A turbine-driven auxiliary generator of 500 kilowatts capacity acts as a standby unit for each bus, and an automatic change-over device is provided for shifting the load when the speed of the main unit drops below the prescribed 70 per cent speed. The standby sets are motored by their own generators at about 95 per cent speed when acting as stand-bys and the turbines operated with closed throttle on vacuum. The units which are driven by the main propulsion plants are furnished with voltage regulators for maintaining constant voltage. An additional turbine-driven auxiliary generator of 200 kilowatts capacity is also provided for use either as a stand-by or for port conditions. Each of the turbine driven sets is provided with its own condenser.

Lubrication

A tank mounted above the turbine provides a fixed oil pressure for lubrication, all lubricating oil being first pumped to this tank. If the oil pressure for any reason should drop below a safe limit, an automatic valve operates to close the main governor-control valve.

Small sight-flow glasses are attached to each turbine bearing to enable the attendant to see at a glance whether the bearings are getting an oil supply. These flow glasses indicate the flow when the turbine is revolving in either forward or reverse direction.

Northern rotary pumps take care of the service requirements for lubricating oil; and this oil is kept clean by a centrifugal purifier supplied by the Turbine Equipment Co. A No. 3 special Paracoil lubricating oil heater and an Alco cooler are installed in the lubricating oil circuits.

Condensers

Correct and efficient functioning of the surface condensers is an essential factor in the reliability and economy of boilers as well as turbines in modern ma-



Left: Auxiliary condenser and its circulating pump.

Center: Overboard discharge connection on main condenser.

Right: One of the main circulating pumps.



rine plants. The highest vacuum consistent with proper power expenditure in the circulating pump and other auxiliaries is required to fully realize the inherent economy of the turbines. Even more important than vacuum, so far as reliability of the ship is concerned, is absolute tightness for the condenser and total exclusion of salt water from the condensate which is, of course, used for boiler feed. In the particular instance of the Santa Rosa there is a severe additional requirement in that the condensers and condenser auxiliaries must occupy an unusually small space.

The original specifications for the ship called for a vacuum of 28.25 inches with 75 degrees sea water, which is the average temperature for the voyage. The Ingersoll-Rand Company was able to show from actual performance records of existing marine condensers that it could produce a vacuum $\frac{1}{4}$ inch higher than specified under these space limitations, and it was therefore commissioned to build the condensers. This one-quarter of an inch extra vacuum adds two per cent to the power which a turbine can produce with a given quantity of steam. Thus the Ingersoll-Rand condenser is able to add 280 horsepower to the output of the Santa Rosa's turbines, when extra power is desired, and at other times to save two per cent in the fuel cost. To obtain 28.5 inches instead of 28.25 inches vacuum with 75 degrees sea water, a condenser must have some 30 per cent additional heat transfer capacity.

The fundamentals of the design include: the pear-shaped shell which has long been accepted as theoretically correct; a precise spacing of the condenser tubes at varying pitch in different portions of the condenser as determined by calculation in a model test; a system of steam flow control within the condenser which automatically proportions the quantity of steam flowing to any given element along the length of the condenser so as to satisfy its full condensing capacity.

Another feature which plays a considerable part in the success of the condenser is the external air cooling compartment. This air cooler not only increases condenser efficiency but also augments the capacity of the air ejector and renders the condenser less sensitive to air leakage. All necessary functions are accomplished by the shape of the outside shell and the arrangement of tubes and tube supporting plates, thereby eliminating numerous and somewhat delicate internal parts often used.

For protection against corrosion from salt circulating water, aluminum brass tubes were used and the water chests were made of ample volume to eliminate turbulence. All elements of the condenser exposed to salt water were thoroughly bonded together with hardened copper bolts, and all ferrous metals were given a protective insulating coating against electrolytic action. This protection extends to the inlet and outlet pipes and the circulating pump.

Condenser tube packing is entirely eliminated. All tubes are solidly expanded into the tube sheet at both ends. Special boring and reaming of the sheets for tube holes, holding of tube diameters to a very close tolerance, suitable annealing of tubes, the use of special expanding tools, and careful workmanship all combine to produce a permanently tight joint. To take up expansion all are given a slight initial bowing, which takes care of differences in the tubes; and the tube sheet at one end is carried on a bellows expansion joint incorporated in the condenser frame, which takes care of any expansion of the tube bundle as a whole.

That this construction is tight is shown by the fact



Fire room on the Santa Rosa showing two of the four Babcock & Wilcox-built oil-burning water-tube boilers.

that on the trials, and in the very considerable number of hours of condenser and boiler operation for general test purposes the salt content of the boiler feed water as tested by all known methods has not changed.

The Ingersoll Rand vertical motor-driven centrifugal main circulating pumps are said to be the first pumps of their type built in the United States. The pump is located below the floor plates and is so arranged that practically no inlet circulating water pipe is required, there being only an expansion joint between pump discharge and condenser water inlet and a very short section of copper pipe between the pump suction and the sea valve. In construction, the pump is arranged so that it can be entirely disassembled without disturbing the motor.

Steam Generating Plant

On each of the new liners Santa Rosa and Santa Lucia steam will be supplied by four Babcock & Wilcox boilers each having 4890 square feet of boiler heating surface, 2103 square feet of superheating surface, and 2099 square feet of economizer heating surface, or a total of 19,560 square feet of boiler heating surface, 8412 square feet of superheating surface and 8320 square feet of economizer surface, in four boilers. These boilers have been built in accordance with the rules and regulations of the U. S. Steamboat Inspection Service and the American Bureau of Shipping, for a working pressure of 420 pounds per square inch.

The superheaters are of the interlock type, amply shielded from the radiant heat of the furnace, and are located entirely within the boiler casing. They are designed to give a total steam temperature of 775 degrees Fahrenheit at the maximum rate of operation.

The boilers are arranged in pairs, side by side, two boilers facing forward and two facing aft, affording a common athwartship firing angle.

Each of the four boilers is equipped with one Babcock & Wilcox internal drum-type desuperheater to furnish steam for auxiliary purposes. These desuperheaters, being entirely within the boiler, operate without heat loss. Their action is entirely automatic, and the apparatus is of extremely simple and rugged design. All steam passes through the superheaters and the required amount is then desuperheated. Such a procedure prevents excessive steam temperatures, affording additional protection to the superheater tubes when a considerable amount of the total steam being generated is to be used in saturated steam auxiliaries.

Each boiler is equipped with two superimposed Babcock & Wilcox wrought steel economizers, which, at maximum power, raise the temperature of the entering feed water to approximately 320 degrees Fahrenheit, thereby lowering the entering gas temperature and adding to the efficiency of the boiler unit.

The furnaces of all boilers are lined with Babcock & Wilcox No. 80 Firebrick and Special Insulation to permit operation at continuous high rating, with a minimum amount of refractory maintenance. Bailey thermo-hydraulic feedwater regulators are fitted to the steam drums of each boiler to automatically control the amount of feed and the level of the water in the boiler drums. The boilers are arranged with a double air casing for oil burning.

Five Babcock & Wilcox mechanical atomizing oil burners of the Cuyama design are fitted to the double front of each boiler to operate under forced draft. Each boiler will be mechanically cleaned during operation by an installation of Diamond Power Specialty Corporation's automatic valv-in-head G9B soot blowers, consisting of six 2-inch Calorized units and two 2-inch plain units for each boiler and superheater installation. The economizers for each boiler will be cleaned by six 2-inch plain units.

It might be well to mention that under normal operating conditions, these vessels will operate on three boilers, the fourth boiler being carried as a spare and available for cleaning and repair while on scheduled runs without loss of speed or power.

Main Feed Pump

Feed water for this boiler installation is furnished by a De Laval high speed high pressure 4-stage centrifugal pump directly connected to and driven by a De

Laval velocity stage turbine designed for the use of high pressure superheated steam. This pump will deliver from 200 to 500 gallons per minute against a pressure of 500 pounds per square inch at 3500 revolutions per minute. The impellers of the pump, the diaphragms separating the stages, the internal passages, and the leak-off drain to suction are so designed and correlated that the rotor and impellers in operation run in perfect hydraulic balance with no metallic contact on end thrust bearings in either direction.

The De Laval velocity stage turbine is so designed that high pressure steam is confined to the steam chest, valve casing, and nozzles. The steam in wheel casing adjacent to rotor shaft bearings is at exhaust pressure or lower than atmosphere. Two governor valves and mechanisms are installed, one for service requirements of speed or pressure, the other for emergency shut-off.

As stand-by main feed service, a Worthington vertical triplex reciprocating motor driven pump of equal capacity is installed and for port service a motor driven vertical reciprocating pump of smaller capacity.

Installed in these feed water systems and in the fuel system of the boilers are the following items of equipment supplied by the Davis Engineering Corporation:

Two No. 12-11 Improved Paracoil first-stage feed water heaters.

Two No. 14-6.5 Improved Paracoil second-stage feed water heaters.

Two No. E-75 Paracoil drain coolers.

Two No. K-50 Paracoil tubular fuel oil heaters.

One No. 37-20S Paracoil salt water evaporator with automatic feed control.

One No. 37-20S Paracoil fresh water evaporator with automatic feed control.

Each first stage Paracoil feed water heater has a capacity for raising 60,000 pounds of water per hour from 107 degrees Fahrenheit to 170 degrees Fahrenheit when steam pressure in shell is maintained at 7.72 pounds absolute per square inch. Each second stage heater raises 60,000 pounds of feed water per hour from 170 to 240 degrees when steam pressure in shell is maintained at 44.8 pounds absolute. The third stage heating from 240 to 320 degrees is effected by the economizers built into the boiler uptakes as described heretofore.

Marshall-Newell Supply Company of San Francisco are furnishing a quantity of engine room supplies for the new Grace ships.



An airplane view of the yard of the Federal Shipbuilding & Dry Dock Company, at Kearny, New Jersey, showing the S.S. Santa Rosa a little after her launching, March 24, 1932, and two of her sisters, the Santa Paula and the Santa Lucia, on the stocks. The Santa Elena was launched November 30 from the slip vacated by the Santa Rosa.

—Photo by Fairchild Aerial Surveys Inc., N.Y.C.

The wheel house of the Santa Rosa, shown in this illustration, is equipped with every necessary device for safe, fast, modern navigation and for the control of the various devices which insure safety at sea.



Navigation Equipment

The wheel house and bridge of the Steamship Santa Rosa is equipped with the most modern type of navigating equipment. This includes a complete Sperry gyro-compass system consisting of one master compass, the steering repeater compass, one located in the wheel house and one on the after docking bridge. There is a bearing repeater compass on a pelorus stand on the top of the wheel house and also one repeater for the radio direction finder.

The gyro-compass motor is supplied from the emergency lighting panel and there is an alarm system in the wheel house to indicate the failure of the repeating system and also an alarm buzzer to indicate the failure of the ship's electrical supply system.

In addition, there is a Sperry gyro-pilot and electric steering control operated from the master gyro-compass. This unit is arranged with the usual clutches so that hydraulic pumps of the steering gear may be controlled either from the gyro-pilot or from the manually operated hydraulic telemotor.

There are also installed in the wheel house Sperry helm angle indicators and Sperry revolutions indicators.

A Fathometer, installed by the Submarine Signal Corporation, indicates echo soundings in the wheel house and enables the navigator to have a practically continuous record of the depth of water beneath the ship's keel.

A Louis Weule Company motor-driven sounding machine insures dependable prompt soundings by the lead and line method. This machine, manufactured in San Francisco, has achieved a notable reputation as one of the foremost electro-mechanical devices for rapid soundings.

Cory Kent clear vision screens insure the navigator a clean windshield even in driven sleet, hail, or rain. Cory engine room telegraphs transmit orders from bridge to operating stand in the engine room.

There are two sets of transmitters and indicators on the bridge, each set consisting of a transmitter and reply indicator for the starboard shaft and a transmitter and reply indicator for the port shaft, mounted on a common pedestal. One set is located on the port side of the bridge and the other set on the starboard side of the bridge. In the engine room there are two indicators with their reply transmitters, one for the starboard shaft and one for the port shaft.

A mechanical docking telegraph is provided to operate between the bridge and the after docking bridge. There is also, in this same system, a steering telegraph in the steering gear room, and the various dials are so marked that the telegraph may be used for either docking orders or steering orders.

The ship's wireless equipment consists of an R.C.A. 500 watt tube type transmitter for intermediate and short wave telegraph transmission, power being supplied from the emergency generator switchboard, and one R.C.A. 50 watt emergency intermediate wave tube transmitter, operated from storage batteries. There are two R.C.A. receivers, one a combined intermediate and long wave receiver, and the other a short wave receiver.

An R.C.A. radio direction finder of the latest type is installed for assisting in the navigation of the ship. This is operated in connection with the wireless apparatus, and for accuracy of reading is provided with a gyro-repeater compass from the master gyro.

There is also provided a Cory loud speaking telephone system for establishing communication between the bridge, after docking bridge, steering gear room, engine room, and chief engineer's room. Voice tubes are provided between several stations, as standard compass and steering compass, captain's room and wheel house, wheel house and radio room.

Safety Equipment

As has already been noted, the new Grace Liners are inherently safe ships. In subdivision and other built-in features they exceed all requirements of national inspection service rules or international convention suggestions. In addition to built-in features, such as watertight bulkheads, double bottoms, wing tanks, and watertight doors, every ship, no matter how well built, must be prepared for emergency.

Fire Detection and Extinguishing System. To detect the presence of a fire in any of the cargo holds, paint rooms, lamp rooms, etc., a Rich detecting system is fitted which immediately shows the presence of smoke in an indicating cabinet located in the wheel house, each compartment being connected by a separate tell-tale so that the exact location of a fire is instantly known. These various compartments are connected up with a Lux carbon-dioxide distributing system for extinguishing fires, operated from two distributing manifolds.

A very complete salt water system of fire fighting is

also installed with fire mains and risers and outlets and hoses so arranged as to meet all the requirements of the U. S. Steamboat Inspection Service, and in sufficient number that all compartments within the ship may be reached by not more than one 50-foot length of hose. An appropriate pressure of water will be maintained on this fire main system at all times. Portable fire extinguishers are also provided in all compartments.

In addition to the fire detection system there is fitted a very complete Zonit automatic fire alarm system covering passenger accommodations and crew's quarters that complies in all respects with the latest requirements of the Steamboat Inspection Service. This system is operated electrically upon a predetermined rise in temperature on any of the signalling devices and gives an alarm in the wheel house. Each circuit in this system is also provided with a "break-the-glass-type" box for manually transmitting an alarm.

In case of fire in compartments above the bulkhead deck it is essential to limit the travel of the fire. For this purpose the various spaces are broken up into a number of compartments separated by substantial fire screen bulkheads constructed to comply with the requirements of the International Convention for Safety of Life at Sea, 1929. Where openings are required through these bulkheads fire screen doors of proper construction are fitted. In certain locations ventilation ducts pass through fire screen bulkheads. To prevent a fire from passing from one compartment to another by way of these ducts, fire screen dampers are fitted in the ducts at the bulkheads and are arranged to be operated from either side of the bulkhead or above the deck.

A general alarm system is installed throughout the ship, which operates bells through a controller in the wheel house. These bells will ring continuously or intermittently as may be desired.

Emergency Light and Power. An emergency switchboard serves those lighting and power circuits that are necessary in case of failure of the main source of electric supply from any cause. This emergency lighting panel is located in the emergency generator room on the boat deck and is normally supplied from the main generators. Connected to it is a Philco storage battery of suitable size and voltage and a Winton diesel-driven generator. The system is so arranged on the panel that in case of failure of the main generators in the engine room, the panel will be immediately energized from the storage battery and will continue on the storage battery as long as the main generators are off or until the emergency generator is started. In case the main generators come on while the emergency system is being energized from the storage battery, the automatic switches will throw the battery off and put the system on to the main generators again. By this arrangement the gyro-compass, the emergency lights, the radio equipment, and the emergency hydraulic pump motor must be energized at all times either from the main generators, the storage battery or the emergency generator.

Lifeboats. On the boat deck, there are seven lifeboats with a capacity of 60 persons each and one motor lifeboat with a capacity of 54 persons. These boats are of steel construction and their equipment, releasing gear, stowage, etc., fully comply with all of the requirements of the U. S. Steamboat Inspection Service and the classification societies. They are stowed inboard in mechanical davits and are so arranged that by using tripping chocks it is possible to launch them without the

The Winton diesel emergency generating set on the Santa Rosa picks up necessary lighting and power circuits when, for any reason, the ship's main generating sets fail to function.



use of power for taking in the falls. To get the boats inboard after being lowered, two power winches are provided on the boat deck, one on either side, with suitable niggerheads to which boat falls may be led. All of the davits, boats, and gear were supplied by the Welin Davit & Boat Corporation. The winches are by the Hyde Windlass Company.

Hull Auxiliaries

Electrification of auxiliaries on these vessels is as complete as is possible under present conditions, only those pumps required by law to be steam-driven being so operated. On the under-deck auxiliaries the motors are practically all of the General-Electric enclosed ventilated type. Above-deck auxiliaries are driven by totally enclosed type motors furnished with automatic types of control.

Deck Machinery. The windlass is of the spur gear type driven by a variable speed motor and can hoist two bower anchors each with 60 fathoms of 2-11/16-inch stud link anchor chain simultaneously at the rate of 20 feet per minute.

Aft on B Deck there is a worm driven 50-horsepower capstan which will exert 27,000 pounds pull at a rope speed of 30 feet a minute or will pull in slack line at 90 feet a minute.

Supercore manila hawsers carried by the Santa Rosa were supplied by Tubbs Cordage Company of San Francisco. Panama Mail Line has used Tubbs Supercore for many years and especially wished this hawser for the new ships.

Fourteen cargo winches, 10 forward and 4 aft, serve the cargo booms. All of these are driven through worm gearing with gears of special gear bronze and the worms of special heat-treated alloy steel running in oil. On test these gears developed the highest efficiency ever reached with heavy duty worm gearing. They are very quiet in operation. Ten of the winches are rated at 3 tons on a rope speed of 160 feet a minute and four are rated at 5 tons on a rope speed of 145 feet a minute. Control is of the full magnetic type with automatic acceleration on the last two points. Both solenoid and foot pedal operated braking is provided.

The steering gear is of the electro-hydraulic type

with duplicate sets of electric motor-driven variable stroke hydraulic pumps operating hydraulic ram pistons connected by crosshead and connecting links to the rudder stock crosshead. The steering gear pump is controlled from the wheel house on the bridge either through the Sperry gyroscopic automatic helmsman or through the manually operated wheel and hydraulic telemotor with follow-up gear.

All of the deck auxiliary machinery was built and furnished by the Hyde Windlass Company who also provided two 20 horsepower boat raising winches.

Heating and Ventilation. As these ships will operate in latitudes as far North as New York in the winter time, and also in the tropics, very complete ventilating and heating systems have been installed throughout, consisting of mechanical supply of hot and cold air, mechanical exhaust systems, and natural supply and exhaust systems.

In such spaces as passenger staterooms, dining salons, main foyers, library, lounge, crew's quarters, barber shop, gymnasium, and carpenter shop, even though many of these spaces will normally have excellent natural ventilation, a mechanical thermo-tank system has been arranged that will supply both hot or cold air as may be necessary, in sufficient volume to make frequent changes.

In certain other spaces, such as the galleys, which will normally be warm, cold air only is supplied mechanically.

Certain machinery spaces and also some of the cargo spaces where perishable fruits may be carried are also supplied with fresh air by mechanical means.

In toilets, bathrooms, galleys, etc., mechanical exhaust systems are also provided for drawing out the foul air.

As an illustration of the care with which these mechanical ventilation systems have been worked out, it may be stated that there are 52 separate and distinct systems of supply and exhaust blowers on the ship having a capacity of 170,000 cubic feet of air per minute not including fireroom and engine room spaces.

On the boat deck, the living quarters for officers and galley and pantry spaces and emergency generator room are all heated by a direct steam heating system using radiators.

In addition to the mechanical and natural ventilation systems, there are provided over 200 electric bracket fans which are located throughout the passenger quarters, public rooms, and crew spaces.

Elevators. In addition to the cargo-handling machinery already mentioned, there are five Otis elevators installed, two forward, one amidships, and two aft.

The two elevators forward are each approximately 6 by 8 feet, have a capacity of 2½ tons, and are arranged to operate between C Deck and the lower hold. At the C Deck level, these elevators discharge into an athwartship passageway which communicates with large sideports.

The elevator midship is 5½ by 6 feet with a capacity of 1½ tons and can be used by the ship's personnel and also for moving refrigerated cargo. This elevator travels from the boat deck to the lower cargo hold. On the C Deck level, the elevator opens into an athwartship passageway and, by means of large sideports, cargo may be brought in and out of the ship. This elevator provides ready means for handling ship's stores from

the lower holds directly up to the galley and pantry located on the boat deck and it also may be used by the engineer officers in going to and from their quarters on the boat deck and the engine room entrance on C Deck.

Elevators 4 and 5 serve a number of the after cargo spaces from which cargo can be brought in and out through large sideports on the C Deck level, these ports being of sufficient size to allow an automobile to pass.

Watertight Doors. Openings through watertight bulkheads, eight in number, are fitted with power-operated water-tight doors on the Stone System as supplied by the American Locomotive Company.

These doors can be closed from the wheel house or operated locally and are so arranged that when closed from the wheel house they can be opened locally by a lever on the door control valve—the door remaining open as long as the lever is held in the "open" position, but reclosing automatically when the lever is released by a person passing through the door. Although all doors may be closed from the wheel house, they may be opened only from the local stations.

To indicate at the wheel house whether a door is open or closed, an electric panel is provided showing the condition of every door. This indicator illuminates the proper door number when a door is closed, and the illumination ceases as soon as a door starts to open.

In connection with the power-operated door system, there are four hydraulically operated stop valves on the boilers. These stop valves may be opened or closed locally by hand in the usual manner but, in addition, they may be closed hydraulically from an emergency station on C Deck, remote from the boiler room.

In order to provide additional safety against flooding various compartments, a considerable number of the scupper valves on soil and drain lines are arranged to be opened or closed by hand gear and, in addition, can be closed hydraulically from a central control station on the boat deck.

Hydraulic Bilge Control Valves. Among the various safety features on the ship worthy of particular mention is the hydraulic bilge valve control system.

For emergency bilge pumping, there is provided in the engine room a self-priming submersible motor-driven bilge pump, which is energized from the emergency generator switchboard on the boat deck.

In every lower compartment in the ship are located these hydraulically controlled valves so arranged that the valves may be opened or closed locally by hand or opened or closed hydraulically by remote control, regardless of the position of the valves as set locally.

Located just outside of the emergency generator room on the boat deck is a panel with the operating gear of all of these valves. In the generator room is a motor-driven pump energized from the emergency generator switchboard and an accumulator tank which supplies power for operating the system.

These hydraulically operated valves are also a part of the regular bilge pumping system of the ship on which other bilge pumps may be used, but the system is so arranged that, in case of emergency, the entire control is in the hands of an operator at the panel on the boat deck.

This system does away with the necessity for mechanical operation of the valves by rods and gears from a distance and, in addition, concentrates their control at one convenient point.

Progressive

Boiler Design on American Steamers

Steam Generators of the New Grace Line Intercoastal Steamers Claim to be the Most Efficient Marine Boilers Ever Constructed

THE steam generators used in the new Grace Line-Panama Mail steamers result from intensive study of service requirements and the application of established engineering developments to supplant the original layout of cross drum, straight tube marine boilers with modern marine boiler rooms. The arrangement first suggested for these vessels consisted of six sectional header, cross drum boilers such as have been so commonly used for marine service in past years. This arrangement required two lines of boilers across the hull and was neither an up-to-date nor an ideal layout from an operating and financial point of view.

After thorough investigation, the Foster Wheeler Corporation designed a 3-drum, bent-tube steam generator of which four, with auxiliary machinery placed at the sides, would provide full steam requirements for all purposes. It is particularly interesting to learn that one of the four new steam generators takes up less space than one of the six boilers originally recommend-



Interior view of the furnace, showing the water-cooled side wall at the end of 300 hours test operation. The photograph has not been retouched and the wall is shown in its exact condition at the end of test.

ed in accordance with standards formerly accepted as good marine practice. Three of the four units per ship have capacity to drive the vessel at full speed.

The design features a simple, bent-tube, "A" type, 3-drum arrangement of tubes and drums, but about this water heating surface are incorporated some fundamentally important factors:

1. **Large furnace.** This gives sufficient time for the oil to burn while passing through the furnace, and the time element permits thorough combustion of the fuel with materially less excess air. This in turn provides higher carbon dioxide ($14\frac{1}{2}$ per cent) and greater efficiency. Adequate size assists in maintaining a cooler furnace and excellent combustion conditions.

2. **Water Cooled Walls.** Applying the principles of water cooled walls to marine furnaces of this character gives increased safety through materially increasing the heating surface directly exposed to the furnace, especially as compared with a straight-tube, cross-drum boiler and its small furnace with limited heating surface for absorbing radiant heat. The water walls also assist in maintaining a cool furnace and protect the refractory behind them to an extent which virtually eliminates deterioration of that refractory. The exhaustive tests carried out on one of these steaming units have



Rear view of the completed steam generator, showing the accurately fitted casing that is so necessary for maximum efficiency in operation.

completely upset at least one old fallacy; namely, that an excessively hot furnace is necessary for good combustion.

3. Permanent Furnace. In contrast with the more or less continual brick-work repairs which have been experienced in cross drum, straight-tube marine boilers, these furnaces have been designed on a basis of permanency. Not only are they cooler, as well as more efficient, but, in addition to the long life of the refractory behind the water walls, the large rear wall is constructed of special tile hung upon high temperature resistant metal clips tied into the steel framework of the furnace. This is in notable contrast with fire brick laid up on a thin grout of fire clay and occasional clips every few courses. The new walls cannot fall down and after 300-hour tests indicate little or no tendency to burn down. In addition, these walls are air-cooled by an air jacket carrying air for combustion.

4. Effective Casing. Since it is important to prevent the loss of even small quantities of heat, in order to secure maximum efficiency and since these steamers will be running in torrid climates, it is highly important that the minimum quantity of heat be permitted to escape from the boiler unit. To meet this requirement, an air casing has been incorporated in the design. It extends down outside the rear wall of the furnace, then under the furnace floor to the front, and up along the furnace front to the oil burners. This path of air flow gives a moderate preheat and effects the recapture of heat that may have escaped through the furnace walls, returning it to the furnace in the air for combustion. The system of firing thus comprises forced draft at the burners without a closed fire room and is working out very successfully.

The satisfactory performance of such a system is largely predicated upon a properly designed and constructed air casing. Ample provision must be made for recognized expansions and contractions which will inevitably take place when the boiler is heated and cooled. In the steam generators shown the forced draft casing is not permitted to come in contact with the drums, the movement of which would be apt to permit leakage.

5. Accessibility. When the number of boilers was reduced from six to four, the space released for earning revenue amounted to a saving of 100 tons in boiler weight and 600 tons of cargo cubic space. This reduction in boiler room space placed difficult problems in the way of boiler design and construction since it is imperative that the installation be such that repairs can be made in the space provided. This includes, for example, facility in replacing superheater and economizer tubes. A design which does not permit individual removal and replacement would hardly be satisfactory to operators. This also applies to the boiler tubes closest to the furnace. The construction includes provision for removing and replacing any tube between the superheater and the furnace without removing any other tube.

A description of the Foster Wheeler marine steam generators and tests made upon one of them were published in *Pacific Marine Review*, May, 1932. A brief repetition may be of interest at this time.

Boiler heating surface	4910 sq. ft.
Economizer heating surface	3024 sq. ft.
Superheating surface	1955 sq. ft.
Total heating surface	9889 sq. ft.
Furnace volume	1100 cu. ft.
Maximum designed boiler pressure ...	450 lb.
Steam temperature	750 deg. F.

The normal rating of the boilers is 26,100 pounds of steam per hour and the efficiency shown on test at 27,832 pounds of steam per hour was 87 1/2 per cent.

In conclusion, it is a matter of pride to recognize that these steaming units represent a tremendous advance over the last fifteen years and that, so far as known at this writing, the tests which were run under most accurate supervision indicate the American built marine steam generators in the Panama Mail Steamship Company's vessels to be the most efficient ever constructed.

Book Review

MAN-HOUR ELECTRICAL ESTIMATING MANUAL. By Theodore Henzlerling, consulting electrical engineer. 384 pages, 8x11 inches. Published by Rurick Press, Inc. Price \$10.

A book of labor data for making and checking estimates for all type of electrical installation. For the shipyard this book is valuable for estimating the cost of proposed electrical installations, and for the planning of all such installations.

The introduction gives detailed directions for preparing an electrical estimate and directions for finding and using the data in the book.

The man-hour charts comprise a comprehensive collection of labor data taken from the cost records of thousands of buildings, giving the man-hours required to install 71 different types of electrical equipment in every type of domestic, commercial, and industrial building. Six convenient wiring charts give all necessary data for figuring wiring and switchboard installations for all ordinary lighting and power applications.



Front view of steam generator as set up for tests.

Calol Cutting Gas

*A
Standard Product
for
Pacific Coast
Shipyards*



(Courtesy of Standard Oil Bulletin)

A Calol cutting torch, mounted on a manually operated device, rough-machining a crank shaft in a Pacific Coast shipyard. Many automatic mechanisms are available for multiple operations by this method.

CALOL Cutting Gas is a product recently perfected and introduced to the metal cutting industry by the Standard Oil Company of California, by whom it is marketed. The company's trucks deliver this liquefied petroleum gas in steel cylinders to any point on the Pacific Coast served by Standard Oil trucks.

The gas vaporizes the instant it is released and it is used with oxygen just the same as other cutting fuels. Its use does not call for new cutting torches, just new tips for old torches; and, because it makes clean cuts devoid of hard or carburized edges, it saves machine tools used in trimming and finishing a cut.

The cylinders in which Calol Cutting Gas is contained hold about 775 cubic feet of cutting gas, enough for eight average working days, and the metal cutter gets 2,000,000 B.T.U. The full cylinder of Calol weighs only about 209 pounds. It cuts efficiently for shipyards, steel mills, foundries, boiler shops, railroad shops, mines, chemical plants, manufacturing plants, blacksmith shops, and practically all kinds of industries where metal structures or details have to be cut.

It will be of interest at this point to refer to a few facts concerning the beginnings and development of the gas cutting process. Some points have been brought out as follows by E. L. Mathy, vice-president of the Victor Welding Equipment Company of San Francisco, manufacturer of metal cutting and welding equipment.

"Reference to oxygen for metal cutting was first made by Thomas Fletcher in England in a paper prepared in 1888. In 1901 a German patent was issued to Herman Menne covering the use of oxygen for steelcutting or, as he called it, melting. Probably the first pieces of steel were cut in America by this new method at Cleveland in 1904; but it was experimental work, not commercial.

"The original equipment for metal cutting with oxygen and acetylene was principally a welding torch having a separate tubing that led to the torch tip and supplied the free stream of oxygen needed for metal oxidation. In the earlier development period of the process cast iron could not be cut with it. This is now accomplished through the perfection of equipment, and it is



A battery of Calor Cutting Gas cylinders serving a Pacific Coast ship-wrecking operation.

even possible to cut under water, a not uncommon practice when salvaging sunken ships."

Continuing, Mr. Mathy says, "Probably the first large installation for metal cutting with a substitute for acetylene was made on the Pacific Coast—by our company in 1918 at the Moore Drydock and Shipbuilding Company's plant in Oakland. Subsequently, twenty-one battleships, tenders, and other vessels scrapped by the General Metal Supply Company of Oakland were dismantled with our equipment using city gas and oxygen."

"With the development of liquefied petroleum gas, such as Calor, further strides have been made in the design and construction of cutting torches; and to-day numerous large industrial organizations on the Pacific Coast, such as the Columbia Steel Corporation and the Southern Pacific Company, are using our apparatus together with Calor and oxygen for metal cutting."

It will be noticed that a number of the photographs illustrating this article bear on salvaging operations. They were selected as subjects of general interest. But, as already indicated, salvage operations are only a part of the varied lines in which the process is of prime importance. It constantly meets requirements in steel mills and foundries, manufacturing plants, structural steel plants, and, in brief, in all industries where metal cannot be cut to advantage by pressure.

Scout cruiser Salem, with sister ships Albany and New Orleans, was cut up in 1930-1931 at Bay Point, California, to make scrap steel for the Columbia Steel Corporation's plant at Pittsburg. All told, the Col-

umbia Steel Corporation salvaged a total of 5738 net tons of metal from these three scout cruisers. This included 6-inch armor plate, miscellaneous thinner plates of all kinds, boiler shells, rivets, stay-bolts, cast iron engine bases and frames, and a variety of details too numerous to mention.

The metal thus salvaged from old cruisers and battleships goes to open hearth furnace or foundry. Ingots from the furnace are transformed in the rolling mills into such products as tin plate; sheets either galvanized, black, corrugated; and all gauges from No. 2 down to No. 32 gauge; wire; nails and brads; barbed wire; and reinforcing bars.

Melts from the steel foundry are molded into as varied a line of castings as one could imagine, including car castings for Pacific Fruit Express refrigerator cars and Southern Pacific freight cars; ele-

ments for both river and gold dredges; heavy pipe fittings and hydraulic gate castings. In this foundry it is standard practice to remove the risers from the castings with a cutting torch using Calor Cutting Gas.

Shipyards make extensive use of gas cutting torches in heavy machine operations and many automatic devices have been perfected which permit mass production in metal cutting through ingeniously devised mechanically operated torch guides and holders.

Manually operated devices for cutting single jobs



This operator is busily engaged making little pieces out of big ones with Calor Cutting Gas. The 14-inch armour plate shown here once protected the vitals of one of Uncle Sam's cruisers.



U. S. Scout cruiser Salem being cut up for scrap with Calol Cutting Gas. As shown here, the vessel is resting in a temporary basin dredged to receive her.

within specified accuracy can be readily devised by the expert mechanic on the job or by the tool maker in the larger shops.

The general characteristics of Calol Cutting Gas as reproduced herewith should be of value and interest to all readers.

Properties of Calol Cutting Gas

Vapor Pressure, Lb. per Sq. In. Gauge:

At 70 deg. F.	120
At 90 deg. F.	165
At 100 deg. F.	105
At 105 deg. F.	210
At 130 deg. F.	300

Temp. at which pressure is 0 lb. per sq. in. gauge, deg. F. -44

Specific Gravity of liquid (water=1) 519

A.P.I. gravity of liquid, deg. A.P.I. 60/60 deg. F....146.4

Initial boiling point, deg. F.-45

Final boiling point, deg. F.-40

Weight per gallon of liquid in pounds 4.24

Mean Coefficient of Thermal Expansion:

From 0 deg. F. to 50 deg. F. 001316

From 50 deg. F. to 100 deg. F. 00174

Specific gravity of gas (air=1) 1.523

Specific heat of vapor at 60 deg. F. (Cp) 475

Dew point at 14.7 lb. absolute, deg. F.-44

Cubic feet of gas per lb. of liquid 8.5

Cubic feet of gas per gal. of liquid 36

Maximum Limits of Inflammability (Bulletin 279,

Bureau of Mines, Table 26):

Gas per cent in gas-air mixture for lower explosive limit 2.4

Gas per cent in gas-air mixture for max. rate of flame propagation 4.7.

Gas per cent in gas-air mixture for upper explosive limit 9.5

Maximum Rate of Flame Propagation:

Cm. per sec. in 2.5 cm. diam. tube 82.4

Heating Value:

B.t.u. per cubic foot 2,550

B.t.u. per pound 21,650

B.t.u. per gallon 91,800

Latent Heat of Vaporization at Boiling Point:

B.t.u. per pound 186

B.t.u. per gallon 788



Puget Sound ferry Chippewa, a recent conversion from steam to diesel. In this case, a 1200 shaft horsepower steam plant was replaced by a Busch-Sulzer diesel of 2130 shaft horsepower. No increase in total machinery weight, an increase in speed from 13¾ to over 16 knots, and a reduction in fuel consumption from 10 barrels to a little over 3 barrels per hour were the results of this conversion.

New Marine Diesel Has Operator's Approval

IN an interview with James E. Murphy, marine superintendent of the Puget Sound Navigation Company, of Seattle, we received some interesting data on the performance of their new motor ferry Chippewa, and the reaction of their engineers to some of the particular design features of this modern type marine diesel engine.

The motorship Chippewa, since going into service last April, had up to November 15 covered a total of over 42,000 miles. Under her schedule of seven round trips per day, her daily average is 200 miles, a figure about twice the mileage of the average ferryboat.

As described in our July issue, the Chippewa is a single-ended single-screw motorship equipped with a direct-reversible 8-cylinder 2130 brake horsepower, 2-cycle, trunk-piston Busch-Sulzer engine. The seven daily round trips demand a total of 9,000 landings per year, requiring a yearly average of 45,000 engine responses. This conveys some idea of what can be expected of the maneuverability of a modern marine diesel engine.

Speaking of the mechanical features of the Chippewa's engine, Mr. Murphy states that they certainly are a marked advance in diesel engineering, and have proved to be of great practical value in this severe service. To quote him: "We are operating various types of marine diesel engines, and our engineers had just as many



Upper platform in Chippewa's engine room, showing simplicity of design of the heads of the new Busch-Sulzer diesel.

ideas as to which is the most suitable type. Today we think differently, and particularly after our experience with the Chippewa's engine we feel that the features incorporated in its design make it just about the ideal marine diesel engine. While some years back the open crosshead type was favored for the reason of its resemblance to the steam engine and ease of observation of bearings, we now want a motor more than an engine, if these terms express what we think they do."

A development of this nature has for some time past taken place in the automotive field, where the gasoline engine has been transformed into a gasoline motor, which is expected to function satisfactorily at the will of the driver if properly supplied with fuel, lubricating oil, and water. To be sure, periodic overhauls are expected, and these consist mostly of grinding of valves, replacement of piston rings, and cylinder grinding. Overhaul of bearings is seldom mentioned.

The diesel engine has evidently arrived at this same stage of development. Design, together with proper lubrication, made bearings absolutely safe. Parts subjected to high pressures and temperatures have also been made safe by careful design and selection of materials, such as steel piston heads and simple cylinder head design. The remaining problems are as to the automobile motor, valves, pistons, and piston rings.

The Chippewa's main engine being of the 2-cycle port-scavenging type, exhaust and admission valves are eliminated, together with their operating gear, resulting in a big

(Please turn to Page 455)



Operating stand, showing the feature of visibility for inspection of pistons.



Marine Equipment

WELDED LIFEBOATS ~ MARINE DIESEL TEST
DOUBLE-PURPOSE WINCH ~ FLAMO INSTALLATION

All Welded Motor Lifeboats

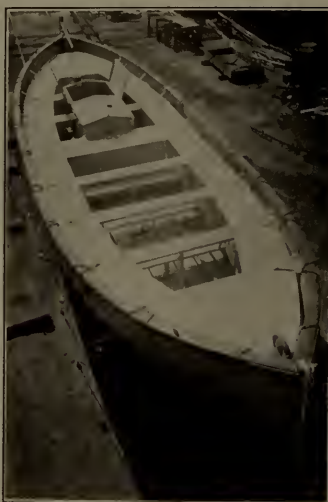
THE use of arc welding in the construction of the hull of small steel boats is still new enough to be of great interest to all naval architects and engineers, and undoubtedly this type of construction has a great future before it.

The United States Army have followed all developments in this field very closely, and when it was found that the transport U. S. Grant of the U. S. Army Transport Service required two motor lifeboats it was decided that they should be of all welded construction.

Plans and specifications were drawn up by the U. S. Army Transport Service and the contract was placed with The Welin Davit & Boat Corporation of Newark, New Jersey. As this company has had more experience than any other company in the United States in the construction of large steel lifeboats, it was quite fitting that they receive the order for these lifeboats. Indeed, the Welin Company had just completed twenty lifeboats for the United States Lines' liner Manhattan which were similar in size and shape to the proposed welded lifeboats.

As these were the first lifeboats of the all welded type, special permission was obtained from the Bureau of Navigation and Steamboat Inspection to use electric welding. These lifeboats are 30 feet long, 9 feet wide, and have a depth of 3 feet 9 inches. The U. S. Inspection Service approved them for carrying 40 persons.

A single length of 1x4-inch bar steel comprises the keel, while the sternpost is built of two pieces of 1/2x4-inch bar steel bent around the stern tube and fillet welded. The hull is of No. 14 B.W.G. black sheet steel and is butt welded. All seams



View looking down on one of the all-welded motor lifeboats built by Welin for the U. S. Army Transport Service.

are backed with 1 8x1 1/4-inch steel straps which are tack welded to the hull.

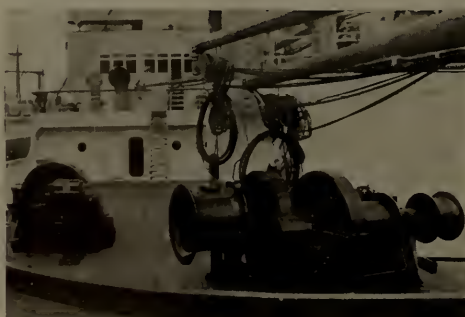
The garboard strake, stem and stern shell plating are flanged to the keel, stem, and sternpost, and are fillet welded both inside and out. It is interesting to note that al-

though the shell plating was of No. 14 gauge metal, no warping occurred during the welding.

The engine is covered by a watertight housing made in two sections for convenience. The intercostals are constructed from No. 12 gauge B.W.G. steel and are tack welded to the floors and shell plating. All air tanks are removable for cleaning and painting. Those in the ends of the lifeboats are made of No. 18 B. W. G. galvanized sheet steel, while those on the sides are made of No. 20 B.W.G. metal.

After the hull was completely plated it was thoroughly sand-blasted and sprayed inside and out with molten zinc by the Schoop or analogous process. This coating was applied to a thickness of about three avoirdupois ounces per square foot of surface, except along the bilge line, stem, and sternpost where it was applied doubly or trebly thick. All metal parts of the boat were treated in the same manner, including the engine casing, but with the exception of small fittings which were galvanized by the usual method.

The power unit selected was a Buffalo Navy Type 25-horsepower motor with electric starter, which proved to be very successful. On the test runs a speed of about 7 knots was obtained, the lifeboats being loaded to capacity.



One of the two Lidgerwood dual purpose winches on the Manhattan. This winch, on a simple change of circuit, can be used as a warping winch with a 10,000-pound rope pull at 80 feet per minute and 20,000-pound pull at 65 feet per minute. The electric controls and the motor are Westinghouse.

Test of a Marine Diesel

A FEW years ago diesel engines running at 1000 revolutions per minute were classified as high speed jobs. However, several hundred of these operating in diversified lines of duty have operated without evidence of any difficulty due to high speed. Many have operated several thousand hours under full load conditions without even a normal overhaul. Bearing troubles, rod, piston, and crank troubles have been practically eliminated, and these parts are the ones always questioned in high speed work.

The Buda-M.A.N. marine diesel engine, model DM6-17 was recently given a 150-hour full load nonstop test at the company's laboratory, operating at 1200 revolutions per minute. This is a six-cylinder, full diesel, 5 $\frac{1}{4}$ x7, rated 104 horsepower at 1200 revolutions per minute, 125 horsepower at 1500 revolutions per minute at 75 pounds brake mean effective pressure.

Hourly dynamometer readings, inlet and outlet water temperatures, fuel consumption, oil temperatures in the sump, oil temperatures in the cooler outlet, barometric reading room temperature and lubricating oil consumption were taken throughout the entire 150-hour run. Exhaust gas temperatures were also measured, and local temperatures of the cylinder block were taken at six points. Local cylinder head temperatures were checked at four points each, and volume of water delivery from the engine, as well as lubricating oil capacity, were also checked and a complete log kept covering the run.

The fuel oil consumption at 75 pounds brake mean effective pressure amounts to 0.45 to 0.5 pounds per brake horsepower hour. The use of the oil cooler is justified, as proved during this run, as it enables the operator to use the light oil which results in greatest horsepower output.

During this test the cooling was arranged to hold the jacket water below the temperatures causing salt precipitation for sea water. After the test the engine was disassembled and all parts were carefully examined for wear or evidence of faulty design, and it was found that all parts functioned normally.

Shock Absorber Head

The cylinder heads are of Ni-



The Buda-M.A.N. 104-horsepower at 1200 R.P.M. marine diesel on the test stand.

Chrome iron with replaceable valve seats. The combustion chambers in the heads are the latest M.A.N. type, with two separate "after chambers" which effect a perfect combustion, with clean exhaust throughout the total load and speed range of the engine.

To explain this after chamber principle, for which a patent has been applied, let us consider an engine cylinder of given displacement, filled with air and the residual exhaust gases. The piston compresses the air to the pressure and temperature required for compression ignition. At this point, fuel in a rather coarsely atomized condition is injected at low pressure into the firing chamber, which is nothing more or less than an ordinary combustion chamber in contact with the piston head. The fuel is injected as a single jet. The amount of air in the firing chamber is only a portion of the total air charge, the

rest of it having been forced by compression into other chambers out of contact with the fuel and fire. Combustion takes place in a mixture that is overrich, with slow burning and low pressure rise. The heat of this combustion is conducted through drilled air channels to the air stored in the after chambers, and pressure equilibrium is established.

Operation in the laboratory for 7000 hours has proved conclusively that this system will give the results required of a marine diesel engine. High pressures are avoided, and the engine structure is protected. The pump can be timed by ear if necessary. The nozzles give no trouble. The engine will idle indefinitely at any speed between 150 and 1500 revolutions per minute. The exhaust is smokeless up to 80 pounds brake mean effective pressure.



The stern of the motorboat Catalyst of Seattle featuring the installation of four large Hamo cylinders for supplying gas for use with the Bunsen burners and chemical hot plates of the Oceanographic Laboratory. Hamo is manufactured and supplied by the Standard Oil Company of California.



American Shipbuilding

Edited by H. C. McKinnon

Repairs to Boxer.—Berg Shipbuilding Company, foot of 26th Ave., N. W., Seattle, was recently awarded contract for repairs to the U. S. Department of Interior steamship Boxer. The vessel will be used as a medical clinic in connection with the work of the United States Department of Interior. Work which the Berg yard will do is simply to make the vessel seaworthy. If any alterations are necessary to convert the ship into a medical clinic, this work will perhaps be done at Ju-neau next summer.

Bids Called on Lighthouse Tender.—Bids will be opened November 29 by the Commissioner of Lighthouses, Department of Commerce, Washington, D.C., for the construction of a new lighthouse tender for service upon the coast of Alaska. Delivery of the vessel is to be taken at San Francisco or Seattle. This vessel is to be a twin-screw steam-propelled vessel with steel hull. She will be 175 ft. long and will have 1000 horsepower engines. The vessel will replace the tender Fern, which is a small wooden vessel and has become unsuitable for Alaska service.

The new tender Hemlock will be used in the work of carrying supplies to lighthouses, maintaining the buoyage system, and building and repairing the many automatic lights in use in the Alaska district. Headquarters of the vessel will be at Ketchikan, and it is being designed to carry on lighthouse work both on the outside coast and the inside waters of Alaska. The Hemlock will be a sister ship to the tender Arbutus now under construction at the Pusey & Jones Corp., with minor modifications suiting her to more severe weather conditions to be encountered on the Alaska coast.

Ship Scrapping to Provide Work for Yards.—It has been announced that the contract entered into whereby the Shipping Board sold to the Boston Iron & Metal Company of Baltimore 124 ships for scrapping provides that the purchaser should spread the work among sev-

eral shipyards in order to relieve unemployment conditions in these plants. The Yards specified were the Federal Shipbuilding Company, Kearny, N. J., the Sun Shipbuilding & Drydock Co., Chester, Pa., and a yard in or about New Orleans or Mobile. The contract price for the vessels is \$1.51 per gross ton of recoverable scrap. Dismantling work is to be performed over a period of three years with a requirement of not less than three ships to be scrapped each month.

New Superintendent at San Pedro Plant.—Thomas B. Forster has been appointed to the position of General Superintendent at the San Pedro Works, Union Plant, Bethlehem Shipbuilding Corporation, Ltd. Tom Forster is well known up and down the coast—and to all the ship personnel operating in and out of the Port of San Francisco—and has been sales engineer with the San Francisco plant for some time. Prior to that he was with the Hanlon shipyards at Oakland as naval architect and estimator.

Forster succeeds E. W. Hannay, who has retired.

United Gets Order for Motor Lighter.—United Dry Docks, Inc., Mariner's Harbor, Staten Island, New York, has an order from T. A. Kenney, president of the New Jersey Clay Products Company, for a motor lighter for coastwise service. The vessel was designed by Henry J. Gielow, Inc., of New York, and is 185 ft. over all, 43 ft. beam, 14 ft. depth. She is to be powered by two Winton diesel engines developing 700 shaft horsepower. The vessel is to be of welded channel construction.

Rebuild fishing boat.—San Diego Marine Construction Co., San Diego, Calif., recently reconditioned the fishing boat Fortuna for use as a ferry and for towing service during the off-fishing season. She will be used as a seiner during the summer. The old gas engine has been replaced by a Hall-Scott 100-horsepower 2tol reduction gear gas engine.

Moore Gets Big Repair Job.—One of the largest repair jobs that has been done on the Coast for several months is the damage repairs to the Union Oil Co. tanker Cathwood, which was awarded to The Moore Dry Dock Company, Oakland. This tanker went ashore on Montuosa Island near Panama several weeks ago, the impact smashing in about 70 feet of the bottom. She was temporarily repaired at Balboa and made San Francisco under her own power. The work will cost about \$80,000 and will necessitate the replacing of about 45 bottom plates.

Fish Boat Repairs.—The fish boat Asama, J. Shioji, owner, was damaged by fire to the extent of about \$2500 at Fish Harbor, San Pedro, lately.

The tuna fisher Eagle was burned to the water's edge at Brighton Beach lately, and it is reported that bids will soon be asked for repairs.

Loan Moratorium.—Advices from Washington state that officials of the United States Shipping Board are now preparing documents to be presented to the next session of Congress, recommending that shipowners be given a moratorium from the construction loan fund to tide them over the present distressed period. Congress refused such a concession at the last session. About \$140,000,000 have been loaned to American shipowners under the terms of the Merchant Marine Act, 1928.

Welded Barge to be Built.—Sun Shipbuilding Co., Chester, Pa., has an order from the Oil Transfer Corp. of New York for a welded steel barge of 10,000 barrels capacity and with dimensions 175 by 36 by 12 ft. 6 in.

Dredge Hull Ordered.—Dravo Contracting Co., Pittsburgh, Pa., has an order from G. H. Breyman & Bro., New York, for the construction of a steel hull for a dredge, to have dimensions 150 by 55 by 11 ft. 6 in.

Steel Barge. — American Bridge Co., Pittsburgh, has an order from the Sun Oil Co. for the construction of a steel barge to have dimensions 150 by 35 by 10 ft. 3 in. and to have 7000 barrels capacity.



Tug Dearborn, recently completed by the Great Lakes Engineering Works, River Rouge, Michigan, for the Ford Motor Company.

Bids Called for New Cruiser. — Bids will be opened December 14 by the Secretary of the Navy, Washington, D. C., for the construction of a 10,000-ton 8 inch gun cruiser authorized under the Act of February 13, 1929. The cruiser will be built in a private shipyard, in accordance with the provisions of the authorization act, which provided that alternate cruisers would be built in navy and private shipyards. The Navy Department now has nine of these cruisers in commission; namely, Pensacola, Salt Lake City, Northampton, Chester, Louisville, Chicago, Houston, Indianapolis, and Augusta. Six cruisers are now under construction, the New Orleans at the New York Navy Yard; the Portland at the Fore River Plant of Bethlehem Shipbuilding Corp.; Astoria at the Puget Sound Navy Yard; Tascaloosa at the New York Shipbuilding Company; Minneapolis at the Philadelphia Navy Yard; and the San Francisco at the Mare Island Navy Yard. Construction of the new cruiser will probably start in March.

The cruiser Indianapolis was delivered to the Navy Department last month by the New York Shipbuilding Co. Captain John M. Smeallie is her commander.

New Salvage Firm. — The Pacific Towboat Company has been incorporated by several San Pedro and San Francisco men to engage in the salvage of small craft, according to a report from San Pedro. Captain A. C. Wilvers of San Pedro, marine surveyor, is president of the company.

The former army tug Major Evan Thomas has been purchased, and the new company is conditioning the vessel at Fish Harbor yards, San Pedro, for salvage work. She is being fitted with a 400-horsepower Bolinder diesel engine, additional masts and gear. The tug is 106 ft. long, 25 ft. beam, and 9.6 ft. deep. She will have a speed of 13 knots and accommodations for 18 men. She will be renamed Retriever. Captain Edison Brown, formerly with the Merritt Chapman & Scott Corporation and long experienced in

salvage work, will be master of the Retriever.

To Build Gillnet Boats. — The Alaska Packers Association, San Francisco, plans the construction of 60 Columbia River type gillnet fishing boats to be 29 ft. long for use on Bristol Bay. It is reported that about half the boats will be built at the company's plant in Alameda and the balance at the yard of Geo. W. Kneass Co., San Francisco.

Boatyard Fire. — The boatyard of Geo. W. Kneass, 18th & Illinois Sts., San Francisco, suffered a heavy loss by fire recently. The insurance coverage is reported to have amounted to \$40,000. The plant is being rebuilt.

Louisiana to have Training Ship. — The Shipping Board on October 26 authorized the transfer of a suitable vessel to the Navy Department for loan by it to the State of Louisiana for use as a training ship. A laid-up ship of about 8500 tons deadweight will be selected.

Repair Army Transport. — General Engineering & Dry Dock Company, Oakland, Calif., has contract from the U. S. Army Transport Service at San Francisco for the reconditioning of the transport Meigs at a cost of \$5181. The work to be done consists of the installation of a large electric dynamo for light and power, repairs in the engine room, and reconditioning of the horse stalls aboard the vessel.

Diesel Recommended for Ferry. — The Shelburne Shipbuilders, Ltd., Shelburne, N. S., has an order

from the City of Saint John, N. B., for the construction of a wooden hull ferryboat, exclusive of the engines. Francis Minot of Boston was engaged to advise on the best type of engine for this purpose and it is reported that he has recommended the installation of a 2-cycle, 4-cyl under Gardner diesel.

Santa Elena Launching Set. — November 30 has been set for the date of the launching of the Grace Line intercoastal liner Santa Elena, the last of the four vessels building for the Grace Lines Panama Mail Service by the Federal Shipbuilding & Dry Dock Company. She is a sister ship of the Santa Rosa, which is fully described elsewhere in this issue.

Repairs to Quarantine Barge. — The General Engineering & Drydock Company has an order for the repair of the quarantine barge R. M. Woodward, which is being done at its San Francisco plant. Work includes retubing of boilers and overhauling the main engine.

Deliver Tug. — Bath Iron Works Corporation, Bath, Maine, delivered the tug T. B. McClintic to the U. S. Public Health Service on October 19 for service in Boston Harbor. The keel of the tug was laid last August 1. She has an overall length of 60 ft. 10 in. and molded beam of 15 ft., with draft of 7 ft. 2 in. She is powered by a 100-horsepower diesel engine.

The vessel has been given the name of a martyr to the U. S. Public Health Service, Dr. T. B. McClintic, who contracted disease in Montana in 1912 while on a research assignment. He died soon afterward.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of November 1, 1932

Pacific Coast

BERG SHIPBUILDING CO.,
Foot of 26th Ave., N.W. Seattle, Wn.
Nenana, wooden hull, stern-wheel, river steamer for Alaska Railroad, Dept. of Interior, Bell St. Terminal, Seattle, Wn.; 235 L.O.A.; 210 L.B.P.; 6 ft. depth; 3'6" draft; 2 tan. comp. steam engs.; wood-burning boilers; 100 pass.; 300 tons freight; keel 7/13/32; deliver 5/10/33 est.

THE MOORE DRY DOCK CO.

Oakland, Calif.
Hull 182, floating crane for Mare Island Navy Yard, for U. S. Navy, Bureau of Yards and Docks; 100 x 45 x 3'10"; 374 gr. tons; keel 10/32; launch 11/32 est.; deliver Dec./32 est.

Hull 183, floating crane, same as above, for San Diego Operating Base; keel 10/32; launch 11/32 est.; deliver 12/32 est.

U. S. NAVY YARD,

Bremerton, Wash.
Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 10/2/32 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD,

Mare Island, Calif.
San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31; deliver 2/11/34 est.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., LTD., Union Plant

Drydock, clean, paint, misc. repairs: stmr. Point Lobos, Shell Oil Co. Barge 6, U. S. L. T. Lupine, m.s. Santa Catalina, m.s. California Standard, m.s. Redline, stmr. Chiriqui, barge Olinda, stmr. President Hayes. Damage repairs: stmr. Cricket. Drydock and repairs to rudder: French stmr. Winnipeg. Drydock, misc. damage repairs: stmr. Tacoma City. 2 cylinder heads and liners for aux. engines: m.s. Santa Monica. 1 set diaphragms and packing: stmr. President Madison. Misc. repairs: stmr. Emidio, stmr. Tamiabua, stmr. Point Ancha, stmr. President Jackson, stmr. Antigua, m.s. Richlube, stmr. Talamanca, stmr. Mariposa, stmr. Mathew Luckenbach, stmr. Georgian, stmr. Point Chico, m.b. Piru.

GENERAL ENGINEERING & DRYDOCK CO., Alameda, Calif.

Drydock, deck and engine repairs: m.s. Motormates. Drydock, clean, paint, engine and deck repairs: ferry Golden Gate. Drydock and misc. repairs: stmr. Yuba, stmr. Gen'l. Frank M. Cox. Drydock, engine and deck repairs: m.s. Associates. Drydock, engine and deck repairs, renewing rivets, etc.: stmr. Frank H. Buck. Drydock, misc. engine repairs: stmr. Santa Monica.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., San Pedro, Calif.

Drydocked, cleaned, and painted: stmr. Argyll (also changed propeller blades and misc. voyage repairs), barge William Muller (also misc. hull work), m.v. Velma (also drew port and starboard tailshafts, installed spare shaft, rewoded stern bearing, and misc. voyage repairs), m.v. New Zealand (also drew port and starboard tailshafts, rewoded stern bearing, and misc. voyage repairs), stmr. Covenia (also minor repairs), stmr. Huguenot (also drew tailshaft, rewoded stern bearing, misc. voyage repairs), Los Angeles Fireboat No. 2 (also minor repairs), m.v. O. A. Knudsen (also misc. voyage repairs). Installed new tail shaft: stmr. Marian Otis Chandler. Misc. engine damage repairs: m.v. Lio. Misc. voyage repairs: stmr. Brandywine.

THE MOORE DRY DOCK COMPANY, Oakland, Calif.

Drydock and misc. repairs: schooner Patterson, pilot boat California, Crowley Barge No. 2. C. G. cutter Shoshone, stmr. Willmoto, freighter Alaskan, barge Maltha, tug Virgil G. Bogue, stmr. Mexican, stmr. Golden Wall, stmr. Vancouver, stmr. Samoa, stmr. Pennsylvanian, stmr. Dakotan.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Dorked, cleaned, painted, annual overhaul: C.G.s. Newington. Docked, cleaned, painted, misc. hull repairs: 2 scows. Docked, cleaned, painted, misc. hull and engine repairs: 5 fishing boats. Misc. hull and machinery repairs not requiring docking: 15 fishing boats.

TODD DRY DOCKS, INC., Harbor Island, Seattle, Wn.

Drydock and misc. repairs: tug Iroquois, stmr. Olympia, stmr. President Cleveland, stmr. President Madison, stmr. San Vincente. General alterations and overhaul: stmr. Dellwood. Misc. repairs: stmr. Barbara Cates, stmr. Border King, stmr. Commander, stmr. Constance Chandler.

U. S. NAVY YARD, Bremerton, Wn.

Repairs and docking: Pennsylvania, Oklahoma, Cincinnati, Cuyama. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotovomo.

COLLINGWOOD SHIPYARDS, LTD., Collingwood, Ontario

Side damage, tail shaft examination, relining bottom half of stern bearing, new rudder pintle bush, sundry caulking: stmr. James B. Eads. Odd rivets caulked, electric welding and repairing butt straps: barge Alexander Holley.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE CO., Pittsburgh, Pa.

Purchasing Agent: W. G. A. Millar.
Steel barge for Sun Oil Co.; 150 x 35

x 10'3"; 7000 bbls. capacity; keel 12/1/32 est.; deliver 1/1/33 est.

BATH IRON WORKS Bath, Maine

Dewey, hull 154, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed; keel 11/1/32 est.; deliver 6/11/34 est.

Hickory, hull 156, Lighthouse tender for U. S. Bureau of Lighthouses, Washington, D.C.; 131 long; 24'6" molded beam; 8'6" molded draft; 500 H.P. eng.; keel 8/20/32.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT, Quincy, Mass.

Portland, light cruiser CL-33, 10,000 tons displacement; deliver 2/15/33 est.

Lurline, hull 1447, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20 1/2 knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/32; deliver Jan./33 est.

Farragut, torpedo boat destroyer No. 348, for U. S. Navy; 340 ft. long; 35 knots speed; deliver 2/11/34 est.

CHARLESTON DRY DOCK & MACHINERY CO., Charleston, S.C.

Wylie L. Moore, all welded river towboat for Pure Oil Co., Chicago, for Savannah River; 240 H.P. Worthington diesel eng.; Keck Gonnerman stern wheel drive; keel 7/28/32; launched Oct./32; deliver 11/20/32 est.

DEFOE BOAT & MOTOR WORKS Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.
Escanaba, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine; 1500 S.H.P.; 2 W-T boilers; keel 12/15/31; launched 9/17/32; deliver 11/20/32 est.

DRAVO CONTRACTING COMPANY, Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel stern-wheel towboats for stock; 2 delivered.

Hull 1141, steel hull deck barge for U. S. Engineers, Washington, D.C.; 80 x 26 x 6 ft.

Hull 1142, same as above.

Hulls 1143-1144, conversion of two steel barges to agitator drag dredge units for U. S. Engineers Office, New Orleans.

Hull 1145, one steel hull for dredge for G. H. Breymann & Bro., New York; 150 x 55 x 11'6".

DUBUQUE BOAT & BOILER WORKS, Dubuque, Iowa

Self-propelled 16-inch suction, pipeline dredge for U. S. Engineers Office, Vicksburg, Miss.

Myrtle, lighthouse tender for U. S. Dept. of Commerce, Bureau of Lighthouses; 93x 23x5 ft.; 2 Atlas-Imperial diesel engs.; launched 9/30/32.



Captain G. Kakuyama and officers and crew of the Kawasaki Kisen Kaisha steamer Oregon Maru. These officers and men effected the heroic rescue of the crew of the States Steamship Company Steamship Nevada which became a total loss on Amatignak Island, September 27, 1932. (Pictures are through the courtesy of Donald A. Corlett, agent for the States Line at Yokohama.)

ELECTRIC BOAT CO., Groton, Conn.

Cuttlefish, fleet submarine SS171 for U.S. Navy, keel 10/7/31; deliver 12/29/33 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31; launched 3/24/32; delivered 10/27/32.

Santa Paula, hull 122, sister to above; keel 8/4/31; launched 6/11/32.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launched 10/3/32.

Santa Elena, hull 124, sister to above; keel 3/24/32; launch 11/30/32 est.

MARIETTA MANUFACTURING CO. Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Ten covered cargo barges for Campbell Transportation Co., Pittsburgh, Pa.; 132 x 35 x 10 ft.; 8 delivered; deliver balance 8/1/32 est.

Hull 288, steel fuel barge for Campbell Transportation Co., Pittsburgh, Pa.; 110 x 24 x 8 ft.; deliver Oct./32 est.

MIDLAND BARGE COMPANY, Midland, Penn.

Huckleberry Finn, tunnel-stern, stern-wheel, diesel powered towboat for Inland Waterways Corp., Washington, D.C.; 160 by 50 by 8 ft. depth; two 590 B.H.P. McIntosh & Seymour diesel engs.

Tom Sawyer, same as above.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Colombia, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York, 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed, steam turbine drive; 5200 gr. tons, keel 2/29/32, launched 8/6/32, deliver 11/17/32 est.

Haiti, hull 348, sister to above; keel 4/4/32 launched 9/17/32, deliver 12/15/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U.S. Navy Dept.; keel 9/26/31; deliver 5/1/34 est.

Peten, hull 354, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam, 34

depth; 24 loaded draft, 17½ knots speed, 10,940 tons displacement, turbo-electric propulsion; 10,500 S.H.P.; keel 3/9/31; launched 8/15/31 Reconditioning; deliver 2/26/33 est.

NEW YORK SHIPBUILDING CO. Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30; launched 11/7/31; deliver 10/15/32 est.

Washington, hull 406, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 1/20/31 launched 8/20/32, deliver 5/33 est.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft, 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31 launch 9/3/33 est; deliver 3/3/34 est.

NASHVILLE BRIDGE CO., Nashville, Tenn.

Purchasing Agent R. L. Baldwin

Hull 272, deck barge for stock, 100x26 x6½ ft, keel 12/15/32 est. launch 1/1/33 est.

Hull 273, same as above; keel 12/18/32 est. launch 1/3/33 est.

THE PUSEY & JONES CORP., Wilmington, Del.

Purchasing Agent: James Bradford

Arbutus, hull 1057, lighthouse tender for U.S. Department of Commerce, Bureau of Lighthouses, 163'6" L.B.P.; 32 beam, 10'7" mean draft; two triple exp. steam eng.; 2 W.T. boilers; 200 lbs. working pressure; keel 10/12/32; launch 3/1/33 est. deliver 4/19/33 est.

Lila, hull 1058, twin screw, steel, steam-propelled lighthouse tender for U.S. Dept. of Commerce, Bureau of Lighthouses, 163'6" L.B.P.; 32 beam, 8'6" loaded draft 13 mi. speed; two T.E. steam engines, 850 I.H.P.; 2 water tube boilers, 200 lbs. pressure; keel 11/15/32 est. launch 4/1/33 est. deliver 5/19/33 est.

SPEDDEN SHIPBUILDING CO., Baltimore, Maryland

Purchasing Agent: W. J. Collison

Active, hull 272, steel patrol boat for Supervisors of New York Harbor, New York, N.Y.; 121'6" L.B.P.; 24'9" beam 12'9" depth, 550 H.P. Fairbanks-Morse diesel eng.; keel 3/15/32; launched 8/16/32; delivered 10/28/32.

Joseph G. Galtberger, hull 273, diesel tug for U.S. Public Health Service, New Orleans, La.; 71 L.B.P.; 16'11" beam, 8' depth, 210 B.H.P. Fairbanks-Morse diesel eng.; completion 280 days; keel 7/20/32.

SUN SHIPBUILDING & DRY DOCK COMPANY, Chester, Penn.

Purchasing Agent, H. W. Scott.

Hull 148, welded steel barge for Oil Transfer Corp., New York; 175x30x12'6", capacity 10,000 bbls.

UNITED DRY DOCKS, INC.

Mariner's Harbor, Staten Island, N.Y.

Purchasing Agent W. Clute

Wistaria, hull 813, tender for U.S. Dept. of Commerce, Bureau of Lighthouses, 121'4" L.O.A., 25 beam, 9 draft, 9½ knots speed, diesel electric drive, 240 S.H.P. keel 11/9/32 est. launch 1/17/33 est. deliver 2/28/33 est.

Hull 814, lighter for T. A. Knudsen Co., 185 L.O.A., 43 beam, 14 depth, two 200 H.P. diesel engines, keel 11/23/32 est. launch 2/1/33 est. deliver 3/1/33 est.

U. S. NAVY YARD, Boston, Mass.

MacDonough, U. S. Torpedo Boat Destroyer DD 351 for U. S. Navy, 340 ft. long; 35 knots speed, complete 8/11/34 est.

U.S. NAVY YARD New York.

New Orleans, light cruiser CA32, for U.S. Navy, 10,000 tons displacement, deliver 6/2/33 est.

Not named, U. S. Torpedo Boat Destroyer (DD 350) for U. S. Navy, 340 ft. long; 35 knots speed, complete 6/11/34 est.

U.S. NAVY YARD Philadelphia, Pa.

Minneapolis, light cruiser CA36 for U.S. Navy, 10,000 tons displacement, deliver 10/2/33 est.

U.S. NAVY YARD Portsmouth, Va.

Cachet, fleet submarine SS170 for U.S. Navy, deliver 6/16/33 est.

French superliner Normandie, which was launched at St. Nazaire on October 29, will have the four largest motors ever built for any purpose, according to announcement by the General Electric Company, which is acting as consultant. The motors are rated at 40,000 horsepower each, giving the new ship a total horsepower rating of 160,000. They were built by Alsthom, French associate company of the General Electric Company.



Marine Insurance

Is Maritime Safety Profitable?

By Arthur R. Bush,

Past Chairman, Marine Section, National Safety Council

YOUR fleet represents a huge sum of money. Its maintenance is a prime factor in economy. Your superintending engineer is responsible for keeping the ships in the highest possible state of excellence. Reports of fuel consumption are scanned with the same avidity as the plungers scrutinize the ticker-tape. With diligence the machinery is inspected, needed repairs are effected, the engines are turned over preparatory to sailing day. Ships must adhere to their sailing schedules, particularly if they carry mail. In port they are a liability; they earn on the investment only when at sea. And yet, strangely enough, in the practice of accident prevention, no direct, intimate supervision at all comparable with that bestowed on the ship's mechanical equipment is exercised. For some inexplicable reason it is not considered essential.

As illustrative, permit me to cite an instance recently encountered. In the course of conversation with a vice-president of a well known steamship line, the subject of accidents was touched upon. The vice-president was delightfully frank. Despite their membership in the National Safety Council, their accidents steadily mounted. He ranted bitterly against a \$20,000 award a seaman had secured by the simple expedient of fracturing his spine on one of the company's ships. Inquiry revealed that the facilities and services of the Council had never been invoked in his aid. No requisition had been made for posters; those automatically mailed were unsuitable. Safe practices pamphlets he knew not of. The monthly NEWS came regularly, the wrapper was split open and the magazine was placed on a table in the waiting or reception room for casual callers and salesmen to peruse. Not once had the Council been

called on to assist in planning any sort of an effective program; its inexhaustible store of accumulated experiences of the widest possible range was of a world apart. The monthly Sectional News-Letter was deemed as mere blatant ballyhoo and discarded as such. On referring to the necessity of frequent causal analysis, he registered blank amazement. "How," he asked, "is this possible? No one can say what causes accidents. They just happen." Is maritime safety profitable? The answer of the vice-president quoted up to that time, was an emphatic "No!"

The operating manager of a large tanker fleet is not so minded. Council membership to him represents something more than a framed certificate on his office wall. The advantages are availed of to the full. Ship's masters are required to submit in writing the details of every injury, no matter how trivial, and woe betide the skipper when a subsequent infection or complication develops among any of his crew from an accident of which there appears no record. Individual ship safety-committees convene regularly and function according to prescribed procedure. Posters are prominently displayed and changed at frequent intervals. Supervision is direct and personal. The operating manager himself reviews voyage and accident reports with no distinction as to relative importance. Does it pay? I quote ipsissima verba: "Very early in our experience we recognized the tremendous burden saddled to our operating costs by the continuous payments of large sums to claimants injured on board our vessels. Our insurance rates were staggering. Something had to be done about it and something was." . . . "I cannot say," he continued, "just how much money our safety work has net-

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ted us in reduced losses. I can say it is substantial. I know, as an example, that the type of accidents which cost us the most because of their frequency and severity (falls and eye injuries) now seldom occur. In 1928 we had 278 reported accidents, falls and eye injuries constituting 205, or 73.74 per cent of the total. In 1930, reported accidents totalled 105; falls and eye cases, 14. In 1931, with two less ships in service, the number of all accidents was 28, with falls and eye injuries for the first time eliminated."

The importance of a correctly conceived and balanced program scarcely calls for emphasis. Many variants must be considered, depending upon the type and size of the organization and the personal preferences and prejudices of the minds in control. Dynamic personalities decide quickly, translate decision into action, the forcefulness of their character brooking no diversion from the projected course. Men of less resolution falter and frequently fail. There are as many ways of doing a thing as there are men to do it. The principles remain the same; it is in their application that differences occur. No purpose, no plan, no project ever reaches maturity without a propelling power behind it. So self-evident is this that to state it seems almost poeitic. And yet Safety, devoid as it is of anything to intrigue the imagination, lacking anything to stimulate or quicken the emotions, possessing nothing to lure the anathetic mind of man and has much to repel it, totters along, if it totters at all, under the uncertainty of part-time pilotage. Safety cannot be sold on statistics alone any more than a job can be secured on submission of a mere written record. An interview is insisted on. Why? To ascertain and appraise the applicant's personal attributes.

To intensify a safety program demands unwavering managerial supervision. There is no other route. Deprived of continuous oversight, it perishes of ennui. For example, a manager who in the eight years of existence of the plant safety organization never attended one of the monthly meetings of the main or workmen's committees in that entire period! Time was not available. He was too busy. Yet enter his office and he would regale you by the hour with funny stories—the humor of which was lost on everyone but himself. When not telling stories, he made graph charts, priding himself on his artistry and the magnitude of the collection. Press for a decision on an issue long deferred and he would blunt the point of your query with another story. Fetch him back and you would learn more of his experiences in the tropics. Of safety matters he informed himself by a reading of the meetings' minutes. Is it cause for wonderment that the members of the main

committee, consisting of department heads, looked upon the safety meetings as a nuisance, to be avoided whenever possible?

Then there was the manager who dignified the proceedings of the plant safety committee meetings with his presence. The members were obliged to be there. Absences were excusable only for the most valid, not fabricated, reasons. Attendance was a part of their duties for which they received pay. Investigation of accidents was not perfunctory. The injured worker and his foreman were summoned before the committee and conditions leading to the accident inquired into. The committee, itself, not satisfied with reports or explanations, examined the place and apparatus concerned. Where negligence appeared, there was no hesitancy in imposing disciplinary measures.

Further stimulation of interest in Safety was provided by interdepartmental contests by the awarding of monetary bonuses, by tokens of supremacy in the form of cups, banners, medals, etc.; by consideration of safety records in evaluating men for promotion and in innumerable other ways. "Did it pay?" Asked this question the manager replied,—"We cannot maintain any department which doesn't".

Is Maritime Safety Profitable? Do you still doubt it? When a problem arises in your administrative work which you discover difficult, you turn to others in your business who met and mastered a similar situation for information. Why not in matters of safety? Why not ask the opinion of men whose experience in shipping accords them standing? These are not of the efficiency cult, who know all and promise anything; rather are they of that school somewhat in advance of the times, who saw needless suffering as economic waste and the ever-increasing number of killed and injured as a challenge. Who are these men? It would be easy to set down their names, but if I were to do that I could justly be accused of partisanship or, perhaps, politics. They are well known, outstanding figures all and hence accessible. It is they who have made the safety literature of the Council and the trade journals veritable compendiums on the meaning of accident reduction, the accepted modus operandi and its monetary value. If, therefore, in this brief treatise with supporting evidence, I should have failed to establish my case, the voluminous record of experiences referred to will be found to be far more enlightening and certainly more convincing.

[Abstract of an address before the Twenty first Annual Safety Council Congress at Washington, 1932.]

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Diesel Engine Operation

V. Lubrication

By H. A. Shawk*Chief Lubricating Engineer, Associated Oil Company*

AFTER a lubricant has been chosen the engineer's first duty will be to check over the sump tanks, the crank case, the lubricators, and oil lines before the lubricating oil is put into the system. The thermometer should be the friend and constant companion of all diesel engineers. You cannot have too many thermometers. See that thermometers are located in the intake and outlet of the water cooling system. Oil to the bearings, oil from the bearings, the sump, the crankcase, and the oil cooler should all have means of reading the temperatures rapidly and accurately.

A log should be kept for recording all thermometer observations. The log sheets will serve as a basis for reference and also as a guide in the diagnosis of trouble, should it become manifest. Remember there is no substitute for reliable information. We are all familiar with the fellow who makes out "sloppy" sheets with many important items and observations overlooked or purposely omitted. Also with the fellow who invents a lot of information to make it look good for himself. Such an engineer is a

dangerous man to intrust with the responsibilities of operating a power plant at sea or ashore. Data to be of any value must be accurate and thorough.

Most lubrication troubles are caused by the lack of lubrication. Next in line will stand the faulty lubricant. When a job begins to run hot look for line obstructions, plugged lubricators, or other reasons for nondelivery of oil. Improper fits, poor distribution, bad workmanship, all contribute to bearing troubles.

Here are a few reasons for trouble with lubrication in diesel engine cylinders:

1. Tight piston skirts
2. Loose wrist pins
3. Poorly fitted rings in grooves
4. Scraper edges on piston rings
5. Oil save rings with too much return area
6. Pistons without taper at top side
7. Coefficient of expansion unequal between metals in cylinder walls and piston
8. Poor distribution of lubricating oil to cylinder walls
9. Grooves for distribution, poorly designed
10. If splash or spray system, watch closely for signs of under-lubrication
11. Poor cooling system
12. Poor grade of fuel oil
13. Inefficient fuel nozzles
14. Too much fuel oil being injected.
15. Incomplete combustion
16. Late timing of fuel nozzles
17. Dribbling of nozzles
18. Leaking nozzles
19. Exhaust ports too small
20. Exhaust valves too small

21. Poor valves in cylinders, pistons, and rings
22. Poor oil filters
23. Plugged screens of pumps in filters
24. Plugged oil lines.
25. Broken oil pump and etc.

There are, of course, many other reasons but those cover the most common difficulties encountered.
(To be continued)

New Marine Diesel

(Continued from Page 451)

saving of overhaul work. There are, of course, the fuel and starting valve and also the fuel pump with its valves to be taken care of.

The pistons, which are the most important parts, are under constant observation of the operator through electrically lighted glass-covered ports. This feature has proved most valuable, and gives our operators a constant check on piston lubrication and combustion conditions for each cylinder.

Any lack of proper lubrication, incomplete combustion, or undue heating of the pistons due to insufficient cooling medium is at once noted and corrected by the operator while the engine is in operation and before any damage has occurred. If lubrication, piston temperature, and combustion are normal, the pistons remain bright and shiny, while any abnormal condition tends to discoloration and invites investigation by the engineer.

This facility of observation of pistons is particularly important in our service where the engine, immediately upon the boat leaving the slip, is put on full speed without any gradual increase.

Since this feature eliminates all uncertainty as to the various above-mentioned conditions that are of such vital importance for continuous successful operation, and also eliminates much needless overhaul work for inspection purposes, it is highly appreciated by the operating engineers.

Mr. Murphy also stated that this feature of ease of observation of lubricating and combustion conditions, together with simplicity of design, was of considerable assistance in getting their steam engineers quickly acquainted with diesel operation, and that several of their steam men have become enthusiastic and highly competent diesel engineers.

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Foard-Barstow Sails on with Old Hands at the Wheel



Captain Alff S. Hansen.



R. C. Foard.



Isabel C. Freeman.



Otto Westin.
(Photos by Swadley)

FORTY-FOUR years of experience is represented in the four employees of the firm of Foard-Barstow Ship Chandlery Company of San Francisco who of recent date took over the ownership and management of the famed Foard-Barstow service of ship supplies within the Golden Gate.

Captain Alff S. Hansen, a native of Denmark and on the seas since 14 years of age, and with the house of Foard-Barstow for over two years, has become president. Associated with him are R. C. Foard, with thirteen years service; Isabel C. Freeman, who signed on in 1922; and Otto Westin, whose Foard-Barstow work dates back to 1910—forty-four years experience.

All ports know Captain Hansen, who had 21 years in Charles Nelson ships in sail and steam and before that was in vessels flying the Sanders-Kirchmann flag. Among the captain's Nelson Line commands were the schooner *Polaris* and the barkentine *Aurora*. He also was master of the five-masted barkentine *Monitor* on her maiden voyage. With Sanders-Kirchmann Company, Captain Hansen was master of the four-masted schooner *Expansion*. At another point in his S-K service he was three years mate in the *Sumar*. To partly review his seagoing days, it is interesting to know that he was for a number of years on the Australian and South American routes from the West Coast to Africa via the Horn. His last command was the *Kingsbury S.S. Texada*.

R. C. Foard, son of Lorens Foard, pioneer shipbuilder, has become vice-president of the new firm and conducts the price department.

Isabel C. Freeman, who was employed by Hanlon Drydock & Shipbuilding Co. from 1918 to 1922, when she signed on with Foard-Barstow Ship Chandlery Co., is secretary and treasurer of the new firm. We believe Mrs. Freeman to be the only woman secretary engaged in the ship chandlery business. Mrs. Freeman is the wife of S. D. Freeman, well known in shipping circles.

Otto Westin, who hails from Sweden, up to the time of his employment with Foard-Barstow Ship Chandlery Co. was in sailing ships from 1886 to 1905, sailing to all parts of the world. From that time up to 1910 he was working at diving, and since that time has been connected with this firm as an expert in A. Schrader's Improved Diving Apparatus and Elto motor repairs.

Among the internationally known products handled by Foard-Barstow Company, Inc. are A. Schrader's Son (Brooklyn) diving apparatus. "FBSCO" has had this manufacturer's products in California for 22 years; C. A. Woolsey Paint & Color Company's famous copper paint for wooden vessels and other paints and varnishes of their manufacture, along with other well

known brands of marine paints and varnishes; Tubbs Cordage Company's rope almost continually since the early inception of the firm; Elto motors, products of the Outboard Motor Corporation of Milwaukee; Boston & Lockport blocks of all sizes, types, and description; Wall's oakum, product of the Wall Rope Company of New York. In addition to these widely used products, Foard-Barstow line presents marine hardware and all material "from keel to masthead truck" that is needed for ocean, river, and bay craft.

Carl J. Foard, in turning over the wheel to the "new hands," gave us a journey back through the years that we might know the history of this organization. Lorens Foard (Carl's father) founded the house in 1876; the location was at 9 and 11 Market Street, between Steuart and East Street (now the Embarcadero). A general ship chandlery business was launched, and it is interesting to note that among the goods handled were Tubbs cordage and Woolsey's paint.

In 1893 Carl Foard joined the firm and there was plenty to do, supplies for the great sailing fleets and the whalers hailing from many lands. In 1902 the house of Foard merged with Lewis-Anderson Company and the name became Lewis-Anderson-Foard & Company, with headquarters at 26 East Street. This historic location was also the address for the offices of the Shipowners' Association of the Pacific Coast (second floor). The merged firm, says Carl Foard, were supplying seventy-five per cent of the whaling fleet entering the Golden Gate. William Lewis owned a number of whalers. His home was New Bedford, Massachusetts, base of the American whaling armada. The firm of William Lewis & Son at New Bedford handled all the whalebone of the entire trade.

When mother earth kicked over the traces in 1906 East Street was burned the first morning. Carl Foard recalls that exploding "tonite" bombs set up a battle-like din that fateful April morning, exploding in the stockroom of his firm's store. After the fire the company had temporary quarters at 420 Main Street in a building occupied by the Cornell & Company, whose head was T. R. James, and who at that time did all the cask-making work for the whalers.

On May 24, 1906, the Foard-Barstow Ship Chandlery Company was established and the address became 138 Steuart Street. Three years later the location became 153 Steuart. In 1912 the headquarters were transferred to 25-29 Drumm street, and in 1922 another move brought Foard-Barstow headquarters to 101-109 Drumm Street, where their flag now flies, and the name to-day is Foard-Barstow Co., Inc.

Pacific Marine Personals

"NAMES ARE NEWS"

BY PAUL FAULKNER

Association Officers. Los Angeles Steamship Association recently elected officers for the ensuing year. Sam Y. Knight, Southern California manager for the McCormick Steamship Company was installed as president, succeeding R. J. Chandler, vice-president and general manager of the Los Angeles Steamship Company. Harold C. Smith, district manager of Williams, Dimond & Co., is vice-president, and F. A. Hooper, district manager of the American-Hawaiian Steamship Company, is secretary. Directors are: Wm. Groundwater, manager, marine department, Union Oil Company; R. J. Chandler; Harry Dorr, district manager, Norton Lilly & Co.; and E. A. Mills, president, Crescent Wharf & Warehouse Company.

New President for Harbor Board. Following the resignation of Walter B. Allen, who has been president of the Harbor Board for Los Angeles Harbor for 7 years, a new president and vice-president were elected on his nomination. These are Colonel Frank C. Wiser and Gerald Fitzgerald, respectively. Mr. Fitzgerald was named to represent the commission on the Harbor Belt Line board of control. Mr. Allen remains as a member of the harbor commission.

Matson Personnel Changes. In preparation for the entrance of the third new Oceanic-Matson liner Lurline into service next month, a number of personnel changes have been made on other vessels of the Matson fleet.

Captain Charles A. Berndtson, former master of the Malolo, will be the commander of the Lurline. The chief officer will be Captain T. K. Whitelaw, veteran chief officer of the Malolo. Whitelaw made one round voyage on the Monterey. He is succeeded on the Malolo by Captain O. Bergmann, who was for several years commander of the Matson freighter Mana.

Third officer on the Lurline will be H. O. Matthieson, formerly third officer of the Malolo.

Played too Rough. A minor casualty to one of the officers of the



R. Stanley Dollar, general manager of the Dollar Steamship Lines, on his arrival home in San Francisco after a recent trip to New York, declared himself optimistic in his hopes for immediate revival of American shipping.

Malolo while shoreside on a recent voyage was reported. Charles Porta, second officer, went to sea with his left shoulder in a sling, having had the misfortune of dislocating it while wrestling with his brother-in-law.

Seattle Maritime Assn. Captain L. J. Hall, assistant manager of Alexander & Baldwin, Seattle, was elected president of the Maritime Association of Seattle recently. First vice-president for the ensuing year will be John Carmode of the American Mail Line. Second vice-president is Captain J. Howard Payne of the Ballard-Ludlow Ferry Company. Secretary-treasurer is R. K. Brown, Jr., of the General Steamship Corp. Trustees for the year are George Cary of the Puget Sound Tug & Barge Company, Carl Strout of the Pacific Steamship Company, and W. D. Vanderbilt of W. R. Grace & Co.

Shipowners' Elect. The Shipowners Association of the Pacific Coast elected officers recently and Frank J. O'Connor was elected president of the association for the eleventh successive term. R. W. Myers was re-elected vice-president, and Nat Levin was re-elected to the position of secretary-treasurer. The board of directors are made up of: F. J.

O'Connor of the Donovan Lumber Co.; R. W. Myers of Hobbs, Wall & Co.; James Tyson of The Ches. Nelson Co.; S. M. Hauptman of the McCormick Steamship Co.; L. C. Hammond of the Hammond Lumber Co.; Otto R. Johnson of National Steamship Co.; L. C. Stewart of Sudden & Christenson; S. D. Freeman of S. S. Freeman & Co.; H. F. Vincent of the E. K. Wood Lumber Co.; W. R. Chamberlin of W. R. Chamberlin & Co.; John L. Reed of J. R. Hanify Co.; and J. C. McCabe of A. F. Mahony Co.

Steamship Dinner. The Eighth Annual San Francisco Steamship Dinner was held on November 3 in the Gold Ballroom of the Palace Hotel—and has gone down into history as one of the most enjoyable of all dinners held by the shipping fraternity of the Port of San Francisco. One of the charming features of the annual get-together of the shipping fraternity of the Port of San Francisco is that there are no after-dinner attempts at speeches—and the boys have a chance to visit and to greet old friends from other ports who make this a sort of "old grads" night and an excuse to travel a few hundred miles to see their old friends.

General chairman for the 1932 dinner was M. J. (Mike) Buckley of the Dollar Lines. His subcommittees all enthusiastically functioned in their respective fields and credited for the success of the evening is due to the cooperation of all. Albert J. Porter was secretary. Committee-men were: Dinner: Chairman W. J. Edwards; George A. Ames; W. A. Ross; Geo. J. Yater, Membership: Chairman W. C. Empey, Harold H. Ebey, A. S. Gunn, Thos. Crowley. Reception: Chairman M. J. Wright, Chas. W. Cook, Roy S. Wintersmuth, J. Van Meurs, Finance: Chairman C. C. Mallory, Fred L. Decker, P. M. Helway, John T. Grany, Entertainment: Chairman F. J. O'Connor, Hugh Gallagher, Ralph W. Myers, John J. Walsh.

Women's Traffic Club.—The regular quarterly business meeting of the Women's Traffic Club of San Francisco was held November 17 at the Western Women's Club. There

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was an exceptionally good turn out and considerable business was transacted. The annual Christmas Party of the club will be held in December.

Golf Tournament. The American-Hawaiian Steamship Company's Third Semiannual Golf Tournament was held on October 16 at the Oak Knoll Country Club at Oakland. An elimination play preparatory for the tournament was run off on October 9 in four flights, with a prize offered for the winner of each flight.

Flight one was won by G. C. Cole with gross 79, handicap 6, net 73.

Flight two was won by Lou Shain with gross 87, handicap 19, net 68.

Flight three was won by D. D. Miller with gross 97, handicap 23, net 74.

Flight four was won by Dr. P. H. Levin with gross 97, handicap 27, net 70.

The following guests and employees who carried-through the elimination tournament on October 9th completed the tournament on October 16:

	Gross	Handicap	Net
A. B. Camp	82	16	66
Geo. McKay	85	16	69
J. Rattazzi	98	27	71
Dave Wright	92	20	72
Lou Shain	91	19	72
C. Van Covering	88	15	73
J. M. Pruner	98	25	73
T. Foster	95	20	75
Graham Smith	101	26	75
W. La Frenz	92	16	76
Al Johnson	95	18	77
Bill Turner	93	15	78
Fred Hardy	90	12	78
Bob Smith	91	12	79
W. Malberg	101	22	79
F. C. Brotherton	107	27	80
F. F. Morrison	108	27	81
C. G. Hinshaw	105	23	82
B. Brown	100	18	82
E. Moloney	109	26	83
Lou Levin	103	19	84
Joe Carr	101	16	85
M. R. Hickman	111	25	86
E. P. Ritchie	103	15	88
E. E. Lee	116	18	98

The American-Hawaiian Silver Trophy was won by A. B. Camp with a net of 66. Lou Shain, with net of 72, won the runner-up cup.

The silver Guest Trophy was won by George McKay with a net of 69, with J. Rattazzi, runner up, turning in a net score of 71.

A number of the women employees took part in the tournament,



Some shots of the boys who took part in the American-Hawaiian Third Semiannual Golf Tournament at Oak Knoll Country Club, Oct. 16.

ment, the first prize of a silver bud cup going to Mrs. A. Keene with a net score of 78, Mrs. George McKay being the runner-up with a net of 88.

Customs Broker Retires. Frank P. Dow, pioneer customs broker of Seattle and one of the best known figures in Pacific Coast import and export circles has retired from active business and has sold his interest in the firm that bears his name to Robert A. White, his associate for 32 years and vice-president of the firm. The firm of Frank P. Dow Co., Inc., was formed in 1893. Robert A. White, the new vice-president, is also a pioneer in the field, having joined Mr. Dow on January 1, 1900. His son, William D. White, has succeeded his

father as vice-president of the firm.

Obituary. One of the Port of San Francisco's most picturesque figures for many years was Captain Thomas Patrick Henry Whitelaw, skilled as a salvager and wracker of ships, who died at his home 10 Pala Avenue, Piedmont, November 8 at the age of 86. Captain Whitelaw was a native of Irvine, Scotland. He was the last surviving member of the Stevenson schooner crew that sailed with that craft on her trial trip more than half a century ago. He had also been commander and owner of the whaler *La Nief*. It has been estimated that Captain Whitelaw salvaged ships in value at more than \$10,000,000 and made and lost a considerable fortune in his work.

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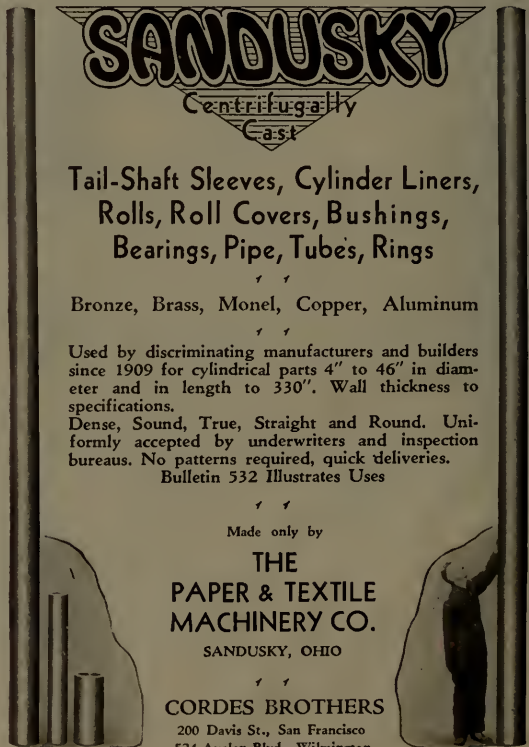
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Members responded in representative numbers to the special invitation of the San Francisco Annual Steamship Dinner committee issued to the Propeller Club, and the evening of November 3 saw a resplendent turn-out at the Palace Hotel. This affair was voted one of the most successful of these annual "gettogethers" from all standpoints including fellowship, entertainment, and attendance and general chairman M. J. Buckley is to be cordially congratulated for the fine work accomplished.

— P C —

Luncheon Meetings

October 25.—Captain R. W. Hadden attracted the largest audience for several meetings and his clear-cut version of progress in Soviet Russia was received with eager attention. This meeting was truly an outstanding demonstration of the keen interest of Propeller Club members in international subjects, and it is hoped that we will be honored at some time in the early future by a "return engagement" of this brilliant authority. Captain Hadden cleared away many of the rumors and ill founded statements which cloud the average American's view of Russian conditions. Whether pro or con on Communism and allied systems of government, the club gave evidence of its fair-mindedness and its willingness to give ear to real facts.

— P C —

October 18. — Propeller Hugh Brown was credited with a "Bull's-eye" in making it possible for us to post ourselves on advanced methods in welding, for it was his good offices which brought to the club exceedingly interesting motion pictures which explained in graphic detail the new processes developed by the Linde Company. The program was presented with explann-

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Visualize the camaraderie of salt-tanged men of the sea and shore-side mariners. Hot dawg! Taste, in anticipation, the choice filets of the Fairmont chef de cuisine.

Or, still farther—

A colorful pageant of bathing beauties (Perhaps we should have mentioned this sooner)—and revue entertainment created around the aquatic theme.

The foregoing burst of verbiage is simply our endeavor to impart some of the enthusiasm which imbues your committees. Boy—what a set-up! What a chance to make this the Biggest and Best!

Captain A. T. Hunter, chairman of the Board of Governors, is working with the several committees headed by Kenneth Ingraham, banquet and dinner; Jerome E. Lalor, decorations; Herbert J. Anderson, entertainment; Bernard Hedstrom, table arrangements; and Fletcher Monson, reservations.

Our worthy president, James A. Cronin, will be on hand—probably wielding the life-saving net.

tory remarks by Charles Hopkins and Charles Smith.

— P C —

November 1.—Our own member Commander T. J. Maher, chief of the U. S. Coast and Geodetic Survey at San Francisco covered most thoroughly the subject of "Modern Methods in Hydrographic Survey" delineating a highly absorbing talk with chart diagrams showing the intricacies of oceanographic work. Another example of authoritative talent in our own ranks!

— P C —

November 8 was largely given over to election duties and no luncheon was held.

— P C —

November 15. — The Club paid honor to Captain I. N. Hubbard, who might rightfully be designated as San Francisco's Dean of Ship Masters. This event brought a fine attendance which was dignified by many of the staunch skippers of the "days of sail." Captain Hubbard began his little talk with personal reminiscences of his experiences as a "bucko mate," when as Mister Hubbard he walked the quarter deck. Great old days, when emergencies were met with real seamanship! The Captain's review of the transition from clipper to modern liner was instructive and fascinating and a general buzz of keen enjoyment followed his discourse.

— P C —

November 22.—With Thanksgiving as the theme, the luncheon meeting was devoted to a Round Table of Good Fellowship. A delightful musical program was enjoyed as a fitting accompaniment to a special Thanksgiving banquet. Thanks go to the entertainment committee for the well planned event. It is fitting that occasionally we can take "time out" for relaxation, society, and friendship.



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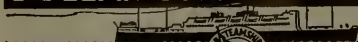
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MISCELLANEOUS CARGO

Luckenbach Steamship Company has announced that it is now prepared to carry from one to ten passengers on its intercoastal freighters.

Bratsberg Shipping Co., 1267 Empire Bldg., Seattle, is a new chartering firm, headed by A.J.H. Bratsberg formerly of Minot, N. D.

Marine Agencies, Ltd., 221 Fidelity Bldg., Los Angeles, is a new steamship agency and is agent for the Blue Star Line. Officers are E. W. Horsman, president; and J. K. Eakin, secretary.

Consolidation of the **Nippon Yusen Kaisha** and the **Osaka Shosen Kaisha** is being considered by the two companies, or at least an alliance will be effected for the expansion of Japanese commercial shipping.

Grace Line has been assigned new terminals at Pacific Coast Ports in preparation for the new service to be operated intercoastal by the four new Panama Mail lin-



New location of the **Lalor Electric and Engineering Company, Ltd.**, at 670 Steuart Street, San Francisco, just three blocks from the water front.

ers. At San Francisco the whole of Pier 35 at the foot of Montgomery Street has been assigned. At Los Angeles Harbor the south half of the new West Basin Terminal has been assigned. The new service includes ports of Victoria and Seattle. Harold Husband has been appointed general agent at Victoria and

will have offices at the corner of Government and Courtland streets.

Sperry Gyroscope Company has some of its equipment on several new and reconstructed ships. These include the Canadian Government tug **Ocean Eagle**, which has a Sperry gyrocompass equipment; the two tug **Saustrum** New York and Havana, which have Sperry gyrocompasses; the four **Grace Lines** **Santa Rosa**, **Santa Paula**, **Santa Lucia**, and **Santa Elena**, which have Sperry gyrocompasses, gyrocompass, rudder indicators, and revolutions indicators; the Italian superliner **Rex**, which has the Sperry gyrocompass and Automatic Steering System.

United Fruit Company has announced from its New York office that **J. J. Kelleher** has been appointed General Traffic Manager with headquarters in New York. Kelleher is well known to the East Coast shipping fraternity, having been traffic manager of the **Cayamel Fruit Company**, New Orleans, prior to its amalgamation with the United Fruit Company.

Diehl Manufacturing Company

Manufacturers of all types of standard and special Marine Motors and Generators for operating pumps, compressors, hoists, blowers, valves, rudder gear, lighting systems, communications, etc. Also Marine Type Bracket and Exhaust Fans and electric Dynamometers for testing purposes. Diehl's reputation for producing electrical marine equipment of the highest quality is of many years standing.

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